Mechanisms of Stress and Dyadic Coping in Chinese Couples:

A Perspective of Between-Person and Within-Person Processes

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ABSTRACT

Utilizing the Systemic Transactional Model (STM), a large number of studies has explored trait-like and between-person components for Western couples' stress and dyadic coping processes. Despite the knowledge, there is a dearth of literature contributing to systematically apply the STM to a collectivistic and Eastern culture (e.g., Chinese). Moreover, although the STM implicitly suggests that stress and dyadic coping processes transpire within individuals over time, within-person components for the process are understudied. Thus, the current thesis applies the STM to examine Chinese couples' stress and dyadic coping processes and proposes an extended STM to investigate both between-and within-person components in these processes. The results are noteworthy: Frist, grounded in the original STM and based on a sample of 474 couples, three empirical studies show that (a) the Chinese version of the Dyadic Coping Inventory supported the conceptualizations of the STM; (b) stress was negatively associated with Chinese couples' relationship satisfaction but dyadic coping was positively associated with their relationship satisfaction. Second, based on a sample of 84 couples, another two empirical studies disaggregated between-and within-person effects and provided substantial evidence that (c) Chinese couples' stress communication behaviors were positively associated with their own relationship satisfaction at both levels and had no harm on partners; (d) the stress-buffering effects of dyadic coping were further confirmed at both levels. The findings also entail important practical and clinical implications for helping Chinese couples maintain their relationships.

ZUSAMMENFASSUNG

Eine grosse Anzahl von Studien hat, basierend auf dem systemisch transaktionalen Stressmodell (STM), Stress- und dyadische Coping-Prozesse auf trait-Ebene und in Bezug auf interindividuelle Unterschiede in westlichen Stichproben untersucht. Es gibt hingegen nur wenige Studien, die das STM in kollektivistischen und östlichen Kulturkreisen (z.B. Chinesen) untersucht haben. Zudem gibt es kaum Untersuchungen zu Prozessen innerhalb einer Person, obwohl das STM implizit postuliert, dass Stress und Coping intraindividuelle Prozesse sind. Diese These untersucht basierend auf dem STM Stress- und Coping-Prozesse in chinesischen Paaren und postuliert ein erweitertes STM um diese Prozesse sowohl auf inter- als auch auf intraindividueller Ebene zu untersuchen. Die Resultate sind beachtenswert. Erstens: Basierend auf dem ursprünglichen STM zeigen drei Studien anhand einer Stichprobe von 474 chinesischen Paaren, dass (a) die chinesische Version des Dyadischen Coping Inventars die Konzeptualisierung des STM bestätigt und dass (b) Stress negativ und dyadisches Coping positiv mit Beziehungszufriedenheit assoziiert ist. Zweitens werden in zwei weiteren Studien anhand einer Stichprobe von 84 chinesischen Paaren inter- und intraindividuelle Effekte disaggregiert. Die beiden Studien zeigen, dass (c) die Stresskommunikation auf beiden Analyseebenen positiv mit der eigenen Beziehungszufriedenheit assoziiert ist und keine negativen Auswirkungen auf den/die Partner/-in hat, und dass (d) dyadisches Coping auf beiden Analyseebenen eine stress-puffernde Wirkung hat. Aus den Ergebnissen lassen sich praktische Implikationen ableiten, die chinesische Paare bei der Aufrechterhaltung ihrer Partnerschaft unterstützen.

CONTENTS

PREFACE

Understanding couples' stress and coping processes is crucial in assisting couples in maintaining their relationship satisfaction. To understand the processes, the Systemic Transactional Model was developed (STM; Bodenmann, 1995) and has been widely applied across different cultures (see Falconier, Randall, & Bodenmann, 2016). However, there are still gaps between how the STM was applied and what the actual phenomena are. For one thing, the Dyadic coping Inventory (DCI; Bodenmann, 2008) that was developed based on the STM has never been rigorously validated in an Eastern culture; therefore, stress and dyadic coping processes have never been tested in an Eastern culture. For another thing, current empirical evidence utilizing the STM was exclusively based on between-person processes, failing in allowing us to capture within-person processes. In addition, the STM used to examine between-person processes also neglects country-specific situations which have influence on couples' behaviors in a particular culture. Thus, it calls for an extended STM that can not only be used to capture both between-and within-person processes but also be applicable to all cultures.

Chapter 1 outlines the overall framework of the thesis. Chapter 2 gives a general overview of the STM, whereas Chapter 3 presents relevant findings contributing to understand between-person processes as well as underlying mechanisms of stress and dyadic coping processes. Chapter 4 sketches out an extended model for the STM by taking into account both between-and within-person components of stress and dyadic coping processes. As this thesis applies the STM and its extend model to examine Chinese couples' stress and coping processes, Chapter 5 briefly summarizes the characteristics of Chinese couples' relationships. Chapter 6 further explains the general research aims of the five empirical studies. Accordingly, utilizing cross-sectional data, Chapter 7 aims to validate the Chinese version of the DCI and Chapter 8 and 9 contribute to apply the STM to Chinese couples from

the perspective of the between-person process, whereas Chapter 10 and 11 apply the extended STM to Chinese couples by exploring both between-and within-person processes with intensive longitudinal data. Finally, Chapter 12 summarizes the main findings, discusses limitations and suggests future directions for research as well as clinical and practical implications.

1 Introduction

Over the three decades, relationship psychologists and family researchers have been focusing on the topic of couples coping with stress (for a review see Falconier, Randall, & Bodenmann, 2016; also Revenson, & Lepore, 2012). This topic offers a lens through which the boundaries of stress and dyadic coping processes have been explored both theoretically and empirically. Several conceptual models relative to this research line were developed, such as Relationship-focused Coping Model (Coyne & Smith, 1990), Developmental-Contextual Coping Model (Berg & Upchurch, 2007) and Systemic Transactional Model (STM, Bodenmann, 1995, 2005). All these models function as theoretical backgrounds for the number of empirical studies and publications within the field (for a meta-analysis based on the three models see Falconier, Jackson, Hilpert, & Bodenmann, 2015). Among all the models applied to empirical studies, the STM is considered as one of the widely used frameworks to interpret how stress can affect both partners' behaviors, how partners communicate stress and therefore how partners cope with stress (Bodenmann, 1995; Falconier et al., 2016). Thus, the current thesis draws on the STM and the relevant measurement tool (Dyadic Coping Inventory, DCI; Bodenmann, 2008) to further explore research questions and aims.

Regardless of the wide application of the STM framework (Falconier et al., 2016; Hilpert et al., 2016) and the most validated scale of the DCI (6 Western languages, Xu, Hilpert, Randall, Li, & Bodenmann, 2016), there is not a systematical study about how all the conceptualized mechanisms of the STM can be applicable to Eastern countries (e.g., Asia) and whether the DCI can be effectively used to assess Eastern couples' stress and dyadic coping processes. It is known that Western countries (Western Europe and the U.S.) are shaped by individualism whereas Eastern countries (e.g. China) are shaped by collectivism (Oyserman, Coon, & Kemmelmeier, 2002). Thus, there is a need to provide a more accurate

measurement and precise inferences of couples' stress and dyadic coping processes in Eastern cultures under the framework of the STM. The primary goal of the thesis is to validate the DCI in Chinese language (Study 1) and test the theoretical concepts of the STM in a large sample of Chinese couples (N = 474) who have been considered as the most collectivistic group among all Eastern cultures (Study 2 and Study 3).

Although emerging findings have supported the framework of the STM, yet current evidence is solely based on the analysis of between-person components. Therefore, little is known about how stress and dyadic coping interact to predict couples' relationship satisfaction from the within-person, across-days perspectives. Failing in exploring the STM at between-and within-person levels can lead to not only an ecological fallacy but also inaccurate and incomplete interpretation of stress and dyadic coping processes transpiring within individuals over time. On the one hand, the STM implicitly outlines a within-person phenomenon for couples' behaviors, even if it primarily allows us to make inferences about dyadic coping differences across individuals. On the other hand, given that cultural differences in stress and dyadic coping processes are well characterized in individuals or couples from East and West ethnic backgrounds, we should not only expect cultural variations across nations, but also expect the STM to be utilized in examining individuals' daily behaviors across situations over time within certain cultures. Accordingly, an extended model for the STM at both between-and within-person levels were conceptualized in the current thesis, which can be applied to both Western and Eastern cultures. Empirically, utilizing a sample of 84 Chinese couples in a diary design, we would explore how Chinese couples communicate stress (mobilize support; Study 4) and how stress and dyadic coping interact to predict their relationship satisfaction (Study 5) under the framework of the extended STM.

2 Systemic Transactional Model (STM)

Here are two members of a couple who are satisfied with their relationship on average. In general, Partner A always communicates stress to Partner B who always provides support to him or her compared with other couples. Accordingly, when Partner A suffers more stress than usual on a particular day, he or she is inclined to talk more and derive more coping resources from Partner B. At first glance, the two phenomena seem to all reflect a couple' stress and dyadic coping processes. However, the two phenomena relative to the processes are shaped by the time frame. The first phenomenon describes the couple' stress and dyadic coping behaviors in general by comparing other couples which is time-invariant, whereas the second phenomenon describes how two persons perceive stress and engage in coping behaviors across everyday situations over time which is time-varying. Therefore, the mechanisms underlying the two phenomena inspire us to explore questions like: What are the mechanisms for couples coping with stress under the background of the two phenomena? If influences of the two phenomena differ for couples, we want to know which one is more important for them. What is the relationship between the two phenomena for couples? How are the long-term effects for these two phenomena? The STM can be utilized to address these issues.

2.1 Origins and fundamental processes of STM

The transactional nature of stress and dyadic coping processes in couples was first demonstrated in an EISI experimental study (Experimentally Induced Stressful Interaction, Bodenmann 1995). After couples experienced stress, they appraised stressful situations and communicated verbally or nonverbally to their partners. Under such dyadic background, both partners provided help to the stressed spouses and they also coped with stress mutually. The classic study sketches out a moment-to-moment process for couples' stress and dyadic coping processes: stress appraisal, stress communication and dyadic coping.

Based on an individual-oriented view of stress and coping (Lazarus & Folkman, 1984), the STM expands the knowledge of primary and secondary stress appraisal processes in couples. For the primary appraisal process, the STM formulates that Partner A not only evaluates the significance of his or her stressful situations but also their partners'. The purpose of this stage is to form a we-appraisal and regard stress as we-stress (Bodenmann, 1995; Falconier et al., 2016, see Chapter 1). For the secondary appraisal process, the STM formulates that Partner A not only evaluates his or her own coping resources but also their partners'. The second stage can lead to different forms of dyadic coping processes. As noted, the whole appraisals are the prerequisite for initiating dyadic coping.

Of note, there are two important recognitions for the appraisal processes. First, the appraisal processes are influenced by the typology of stressor (Randall & Bodenmann, 2009). Stressors originating inside or outside of the relationship can directly affect partners' perceptions and subsequent behaviors. For example, external stressors (e.g., work, parenting) are more likely to elicit stress appraisal processes, as the stressed partner might experience more negative emotions and have a greater need to seek for coping resources. Second, the appraisal processes clearly suggest a phenomenon that occurs within individuals over time. It means that couples can modify the processes over moments, days, weeks or years based on variabilities in stressful situations they encounter. Thus, the appraisal process is not only seen as a stable trait for couples but also a transient state for them.

2.2 Stress processes in couples of STM

As stressors affect the appraisal processes discussed above, this part briefly reviews the role of daily stress on couples' relationships based on the STM. Bodenmann (2005) extended the dimensions of individual stress to dyadic stress, postulating that one partner' stressful experiences can directly or indirectly have a negative impact on the other partner and both partners would face the challenges. Dyadic stress are further classified intro external

(daily hassles or extradyadic stress) and internal (intradyadic stress, Hilpert, Kuhn, Anderegg, & Bodenmann, 2015) stress. External stress refers to daily hassles or events originating outside of the relationships, such as work stress, financial stress, parenting for children. Although these stressors are more attributed to personal experiences, yet the STM argues that external stressors have contagion effects on couples' relationships and might become dyadic issues or concerns. In contrast, internal stress refers to stressors originating inside of the relationships, such as perceived differences between spouses in relation to life needs, goals or values, and personality traits. Of particular interest, the thesis mainly focuses on how external stress can hinder couples' relationships and interact with dyadic coping in predicting relationship satisfaction.

In relation to the impact of external stress on couples, the STM articulates the mechanisms for couples' daily life. On the one hand, couples bring stressful experiences into their family and their stress reactivity affects their perceptions of relationships. For example, stressed spouses can display negative behaviors (e.g., withdrawal) and vent their anger towards their partners (e.g., Bolger, DeLongis, Kessler, & Wethington, 1989). This short-term phenomenon is further defined as *stress spillover* (Randall & Bodenmann, 2009). On the other hand, one partner' stress can not only affect their own emotions and behaviors in the family but also affect their spouse' emotions and behaviors. This short-term phenomenon is further defined as *stress crossover* (Larson & Almeida, 1999; Randall & Bodenmann, 2009). The stress crossover effects affect couples' coping processes as both partners' stress appraisals are based on the more stressed partner' stressors. Although stress spillover has more negative impact on individuals and stress crossover exerts more bad influence on dyads, yet the STM proposes that we cannot solely examine the negative impact of Partner A' stress on his or her relationship satisfaction independent of Partner B' stress in that the impact between Partner A and B' stress and relationship satisfaction is mutual and reciprocal

(Bodenmann, 2005; Falconier et al., 2016).

2.3 Dyadic coping processes in couples of STM

2.3.1 Stress communication

During the stress appraisal processes, the stressed partner should express their need for support from their partner verbally or non-verbally. STM defines the expression behavior as a stress communication process between Partner A and Partner B (Bodenmann, 2005). Partner A anticipates Partner B' positive reactions to regulate their stress reactivity through communicating their specific problems or sharing emotions. However, Partner A's communication behaviors also arouse Partner B' need for sharing his or her stressors. Therefore, either Partner A or Partner B can be the support-seeker and the support-provider. Such dual process of couples' stress communication provides us a unique insight into how stress spillover into relationships and crossover to partners as well as how couples engage in subsequent dyadic coping.

2.3.2 Providing support to partners

The stress communication process further facilitates dyadic coping behaviors. Dyadic coping is defined as a transactional supportive process between two partners wherein Partner A shows comfort, care and assistance to Partner B or they coordinate their efforts in navigating stressful events (Bodenmann, 1995, 2005). Dyadic coping can be positive or negative in forms. Positive dyadic coping is further categorized into supportive dyadic coping (providing support or assistance to the stressed partner) and delegated dyadic coping (shoulder one' responsibilities to alleviate his or her burden in a more voluntary way). Of note, supportive dyadic coping is the most widely studied concept in the current literature, which is further distinguished into problem-focused (seeking for solving practical problems) and emotion-focused (emotion regulation) aspects. On the other side, Partner A may neglect Partner B' stress reactivity and can show reluctance, incompetence, impatience and even

engage in hostile behaviors to the stressed partner, which is considered as negative dyadic coping. The occurrence of negative dyadic coping can also be an indication of exhaustion after providing support to the stressed partner for a long time.

In addition to positive and negative forms of dyadic coping, STM also conceptualizes a significant concept of dyadic coping, which is fundamentally different social support, common dyadic coping. Common dyadic coping considers the reciprocal consequences of both partners' stress and coping processes and focuses on mutual efforts in comforting each other (emotion-focused) and working out solutions together (problem-focused). The concept of common dyadic coping is not only used in exploring mechanisms of couples coping with daily hassles, but also with chronic life events (e.g., illness, Kayser et al., 2007). It means that STM has a wide expansion of couples' relationships in the context of life events.

2.4 The Dyadic Coping Inventory (DCI) and STM

Based on the STM, Bodenmann (2008) developed the original German version of DCI with 37 items. The DCI is comprised of 5 factors related to individual stressors and 2 factors related to common stressors. The 5 factors related to individual stressors include: (a) *Stress Communication*; (b) *Emotion-focused Supportive* DC; (c) *Problem-focused Supportive* DC; (d) *Delegated* DC, and (e) *Negative* DC. The 2 factors related to common stressors include: (a) *Emotion-focused Common* DC and (b) *Problem-focused Common* DC. The DCI includes two additional items that specifically evaluate self-rated satisfaction with the employment of DC strategies. To date, the DCI has been validated in six different languages from individualistic Western cultures and translated into more than 21 languages (Falconier et al., 2016).

2.5 Culture and STM

The STM considers contextual factors or situations as important points that influence couples' stress appraisals and dyadic coping behaviors (Bodenmann, 2005; Falconier et al.,

2016). Cultural environments (e.g., individualism vs. collectivism) can be seen as the contextual factors and situations that impact on how couples in a particular culture view stress and deal with stress (Mortenson Burleson, Feng, & Liu, 2009). Thus, it is expected that cultural expectations and values affect all processes of STM. Despite of this fact, the STM and the DCI have their wide application in both Western and Eastern cultures (Falconier et al., 2016; Hilpert et al., 2016). It also raises the issue how the STM and the DCI should be more adapted to accommodate their use in broad cultural contexts where couples cope with their everyday stress.

2.6 Reconsiderations of STM

The example showed in the beginning of this chapter is closely related to what the STM may provide a theoretical framework in elucidating couples' stress and dyadic coping processes. The STM can be utilized not only in interpreting static behaviors across individuals (trait-like and between-person processes, phenomenon 1 in the example), but also in understanding behaviors within individuals across days over time (state-like and within-person processes, phenomenon 2 in the example). Therefore, the thesis reconsiders four significant points relative to all the aforementioned processes of the STM: (a) given that the STM functions as a framework in understanding couples' stress and dyadic coping behaviors in general, between-person processes are useful for us in investigating mechanisms in different couples from diverse groups (e.g., age, sexual orientation, clinical and non-clinical) as stable traits. For example, we make comparisons between Western couples and Eastern couples' dyadic coping processes and also make comparisons between rural and urban couples' dyadic coping processes in a certain country; (b) while the STM was originally developed in elucidating couples' dyadic coping processes under the context of everyday stress or daily hassles (Bodenmann, 2005; Randall & Bodenmann, 2009), the model should be extremely illuminative in explaining how two members of a couple engage in dyadic

coping on a particular stressful day than usual in dynamic situations. Besides, all the processes proposed by the STM either implicitly or explicitly suggest a phenomenon transpiring within individuals rather than between individuals. Therefore, we should explore how the STM can explain couples' stress and dyadic coping behaviors from the within-person perspective. Clarifying these two levels renders us to further explore which levels of effect matter more for couples; (c) as the STM points out that couple should maintain their relationship functioning through dyadic coping processes in the long run, we should examine how couples' stress communication and subsequent dyadic coping processes predict their long-term relationship satisfaction at both between-and within-person levels; (d) even if the STM has been applied into a variety of countries with different cultural systems, couples in a particular culture may differ in stress reactivity and dyadic coping based on their perceptions of daily situations. Accordingly, there is a need to accommodate the STM to be applicable in explaining the use of dyadic coping behaviors between countries (between-person) and dyadic coping behaviors within a country (between-and within-person).

3 A summary of empirical findings of STM

As the STM has played a vital role in interpreting stress and dyadic coping processes in couples, there is a plethora of literature documenting its empirical application. The following part briefly summarizes empirical findings based on the STM from four aspects: (a) the findings about the negative impact of stress, viewed as a dyadic construct, on couples' relationship functioning; (b) the findings about the positive impact of dyadic coping on couples' relationship satisfaction (direct effects); (c) the findings about how dyadic coping functions as a mediator or moderator in explaining the associations between marriage-related psychological traits (e.g., dyadic stress, religion, love style) and relationship functioning[1]; (d) the findings about culture and the STM. Strengthens and limitations relative to current evidence are discussed.

3.1 Stress and relationship functioning

A number of literature taps into the issue of how external stress and internal stress can impair couples' relationship satisfaction based on stress spillover theory (for a review see Randall & Bodenmann, 2017). External daily stressors, such as work stress (Van, Kluwer, & Karney, 2011; Ferguson, 2011), financial stress (Falconier & Epstein, 2010; Helms et al., 2014), parenting (Berryhill, Soloski, Durtschi, & Reye-Adams, 2016), were found to be negatively associated with couples' relationship satisfaction/quality or well-being. Likewise, Internal stressors, such as conflict between partners (Bodenmann. Ledermann, & Bradbury, 2007; Hilpert et al., 2015), spouses' chronic illness (Milbury, Badr, Fossella, Pisters, & Carmack, 2013), were also found to impair couples' relationship functioning. Of note, several empirical studies have proved that external stress couples experience further increases

[1] The current thesis mainly focuses on relationship satisfaction as the dependent variable that has been widely studied in dyadic coping research and was found to a strong predictor of individual and couples' well-being (see Falconier et al., 2015). Therefore, the terms "relationship quality", "relationship functioning", "relationship satisfaction" are denoted to relationship satisfaction.

internal stress within couples and decreases couples' relationship satisfaction (Bodenmann, Ledermann, & Bradbury, 2007; Falconier et al., 2015; Hilpert et al., 2015; Ledermann et al., 2010). In addition, there are some other studies focusing on within-person associations between stress (mainly external stress) and relationship satisfaction. For example, a study shows that on days when individuals experienced higher levels of work stress, women would express more anger and men withdraw more (Schulz, Cowan, Cowan, & Brennan, 2004). Another study demonstrates that on days when partners' stress was higher than usual, couple enacted more negative behaviors towards their partner and endorsed less positive appraisals of relationship quality (Buck & Neff, 2012). In summary, current literature provides ample evidence about the negative impact of stress, extremely external stress, on couples' relationship satisfaction both cross-sectionally and longitudinally.

3.2 Dyadic coping and relationship functioning

In general, dyadic coping is proved to a robust and significant predictor of relationship satisfaction (see a meta-analysis Falconier et al., 2015). A majority of empirical studies draws on self-reported (cross-sectional or longitudinal) and observational data in exploring the positive association between partners' supportive dyadic coping and relationship-related outcomes. Utilizing the DCI to assess couples' dyadic coping skills, studies reveal that partners' supportive dyadic coping or positive dyadic coping would reduce stress reactivity, enhance psychical and psychological well-being, and improve relationship satisfaction (e.g., Bodenmann, Meuwly, & Kayser, 2011; Bodenmann, Pihet, & Kayser, 2006; Herzberg 2013; Papp & Witt, 2010). On the other hand, two studies based on experimental or observational data also provide evidence that dyadic coping can reduce partners' stress reactivity (Bodenmann et al., 2015; Meuwly et al., 2011). Additionally, common dyadic coping is widely used in the context of couples coping with chronic illness (for a review see Traa, De Vires, Bodenmann, & Oudsten, 2015) as chronic illness is commonly regarded as

we-disease or we-stressor under the dyadic settings (Badr et al., 2010). Several studies indicate that common dyadic coping is positively associated with spouses' health when coping with chronic illness (e.g., Johnson et al., 2013).

3.3 The mediating and moderating role of dyadic coping

Dyadic coping has evolved from a concept explaining mechanisms (*mediation or moderation*) as relationship-related variables and relationship functioning. First, several studies document that dyadic coping has the function of relationship-maintenance and is positively associated with relationship-related variables (e.g., religion, individual coping and communication). Thus, dyadic coping is proved to be a stronger *mediator* explaining the associations between stress (Hilpert, Nussbeck, Bodenmann, & Bradbury, 2013), religion (Rusu, Hilpert, Beach, Turliuc, & Bodenmann, 2015), love styles (Vedes et al., 2016), marital standards (Wunderer & Schneewind, 2008) and relationship satisfaction. Second, as the STM argues that dyadic coping, conceptualized as a moderator, can buffer the negative impact of stress on relationship quality. Therefore, a dearth of research proves that dyadic coping is a strong *moderator* (stress-buffering effect) between external stress and relationship satisfaction (e.g., Falconier, Nussbeck, & Bodenmann, 2013; Lambert, Hasbun, Engh, & Holzer, 2015; Merz, Meuwly, Randall, & Bodenmann, 2014). And one study even shows that dyadic coping buffers negative effects of stress on verbal aggression (Bodenmann, Meuwly, Bradbury, Gmelch, & Ledermann, 2010). In all, dyadic coping has been widely applied in broad contexts in interpreting relationship-related traits and relationship functioning for couples, especially in the context of daily stressful circumstances.

3.4 Dyadic coping across cultural contexts

Until now, there are two projects systematically examining how the STM (dyadic coping) is applied to both Eastern and Western cultures. Recently, a book has been published, *couple coping with stress: A cross-cultural perspective* (Falconier et al., 2016). This book

volume reported how couples in 14 nations employed dyadic coping skills that serve as a predictor of relationship functioning. In general, dyadic coping benefits for couples in these 14 nations. Of note, Eastern couples (Chinese and Japanese) and African couples reported to engage in more negative dyadic coping skills than Western couples. Another study based on 35 nations provides more details about how dyadic coping would predict couples' relationship satisfaction through examining variabilities at the levels of between-and within-countries and testing gender differences (Hilpert et al., 2016). Results show that African nations were below average slope of the effect of dyadic coping on relationship satisfaction and Asian nations were on the average slope level of the effect as European and American nations. Still, dyadic coping had a strong effect on predicting Western couples' relationship satisfaction. In addition, results indicate that the effect of dyadic coping was stronger for women in more than 17 nations.

3.5 Strengths and limitations of current empirical evidence

The STM provides a strong theoretical background for us to examine couples coping with stressful episodes in the context of relationships. Learning from the summary of the aforementioned empirical findings, we know that the STM is fruitful in understanding couples' stress and dyadic coping processes regardless of age, ethnicity, sexual orientation, culture and even coping contexts. These findings directly lead to the development and testing of empirically validated prevention and intervention programs to help couples to cope with stress clinically (e.g., couples coping enhancement training, Bodenmann, 2010; Bodenmann, Hilpert, Nussbeck, & Bradbury, 2014).

However, several limitations need to be further considered, despite of strengths. First, although the STM implicitly suggests a within-person phenomenon between two partners, yet all the studies exclusively examined between-person differences of stress and dyadic coping processes and neglected the slide of within-person variabilities. We only gain an

understanding of how stress and coping behaviors can differ from individuals and how couples' dyadic coping behaviors are related to their own relationship satisfaction in comparison with other couples. Rather, we know less about how couples react to stressors and engage in dyadic coping behaviors on a particular day or across situations over time. Despite the fact that there are longitudinal studies focusing on the long-term effects of stress and dyadic coping behaviors, these studies, however, still investigated behavior relations across couples at a particular point in time. For example, Bodenmann and colleagues (Bodenmann et al., 2006) studied the relationship between dyadic coping and marital quality over a period of 2 years (all the variables were assessed four times). They tested both between-couple effects (i.e., the general differences across all studied couples across all time points) and within-couple effects (i.e., a time point change in the relationship than usual on the day of the study) without clearly disaggregating these two effects. A meta-analysis found that results from these longitudinal studies yielded smaller effect sizes than results from cross-sectional studies (Falconier et al., 2015). In addition, current observational and experimental studies provide us a direct investigation of stress and dyadic coping processes but they do not tap everyday life behaviors at the cost of ecological validity. As the STM is originated under the context of everyday stress, it is more reasonable to study couples' stress and dyadic coping behaviors in a naturalistic setting via using diary studies (Bolger & Laurenceau, 2013).

Second, the current literature is limited in studying how one partner provides support to the stressed spouse or how one partner who suffers from illness cope with stress together with their spouse. However, the stress communication process between two partners is understudied. The interpersonal and transactional process of communicating stress to each other has dual effects of the support-seeker and the support-provider, which in turn provides us an insight about the degree to which they are involved in dyadic coping processes. Thus, it

is equally important to explore the stress communication process between a couple from the perspective of between-and within-person levels.

Third, the STM was developed and widely tested in the context of westernized and individualistic cultures. Even if the STM has been applied to different cultures, scholars reported different and even mixed results through applying the current model directly to examine couples' dyadic coping behaviors (see Hilpert et al., 2106; Falconier et al., 2016). As cultural factors can influence all processes of dyadic coping under stressful situations that couples may encounter in their own living environments, we need a conceptual framework based on the STM not only in interpreting couples' stress and dyadic coping behaviors between countries (between-person differences), but also in elucidating how couples react to stress and engage in dyadic coping under the context of their everyday situations (within-person variabilities). Thus, average level of behaviors and situational influences on these behaviors should be all considered and examined to predict couples' relationship functioning across cultures or countries.

4 An extended model of STM

As discussed above, current empirical evidence did not allow us to completely make inferences about between-and within-person processes of stress and dyadic coping behaviors in couples. Thus, there is a gap between how theoretical knowledge and empirical evidence illustrate the phenomena and how we understand the actual supportive transactions within partners. In the current chapter, I sketch out an extended model to address how the STM can be utilized in interpreting between-and within-person components. At the between-person level, the extended model considers individual differences in stress and dyadic coping behaviors in a broad context: differences across Western (e.g., Swiss) or Eastern (e.g., Chinese) couples from diverse demographic groups and cross-cultural comparisons between Western and Eastern couples in these behaviors. At the within-person level, the extended model considers individual differences across daily situations within a certain Eastern or Western culture or group. Regardless of cultural contexts, within-person analysis captures how couples react to stressors and engage in dyadic coping based on their baseline level. The new model will give an integrated account of all reconsiderations (Chapter 2) of the original STM. The first part will discuss between-and within-person components, whereas the second part will discuss the new explanatory model for the STM.

4.1 Between-person and within-person components

4.1.1 Definitions and mechanisms

Look at the example the thesis presents in Chapter 1. As discussed before, it entails two significant slides of stress-coping processes for the STM: between-person and within-person components. *Between-person* components are broadly defined by behavioral differences between people, which are utilized to capture how individual differences in one variable (e.g., supportive dyadic coping) is associated with another variable (e.g., relationship satisfaction). For example, as we know that Swiss couples and Chinese couples differ in

mean scores in supportive dyadic coping and overall relationship satisfaction, we can further use *t-test* or latent mean testing to compare whether there is significant difference in the association between these two variables for couples from these two cultures. Afterwards, we may get the result that dyadic coping explains more variances in Swiss couples than in Chinese couples (see Study 1 and 2). In addition, if all of the two variables are assessed at only a single point in time, the results we obtain are seen as to be trait-like and reflective of the group' s behavior in general (Hoffmann, 2015). Such macro level of analysis is time-invariant and situation-unspecific. To the best of our knowledge, evidence based on cross-sectional or observational studies just falls into category of interpreting between-person components.

Of specific interest, the STM proposes a moment-to-moment mechanism for everyday stress-coping processes (Bodenmann, 1995; Bodenmann, 2005). Thus, trait-like attributes of the stress-coping continuum cannot remain constant and may change over time, which dovetails with the examination of within-person components of the STM. *Within-person* components are defined as state-like variations and fluctuations within a person and how a person varies in behaviors from their own baseline level. Within-person relationships provide information about how variations related to a persons' own baseline are related across variables (variables are always assessed at more than one occasions). For example, although we get an insight into behavioral differences between Swiss and Chinese couples, yet it is imperative for us to make more precise inferences about how Swiss or Chinese couples respectively react to stress and engage in dyadic coping behaviors in real-life situations over time. Therefore, we examine how Swiss or Chinese couples' supportive dyadic coping would predict their relationship satisfaction on days of more stress in comparison with days when they experience less stress through within-person analyses. Such micro level of analysis is time-varying and situation-specific. As the STM is originated how daily stressors impair

couples' relationships and how couples therefore cope with them (Bodenmann, 2005; Falconier et al., 2016), within-person components are extremely useful in exploring couples' fluctuations in dyadic coping behaviors across daily stressful situations.

Furthermore, as the STM also conceptualizes the stress-coping mechanism of change in couples' relationship functioning (Randall & Bodenmann, 2009), we need to consider effects of change on between-and within-person components. First, although the between-person component is concerned with average coping behaviors across persons, yet it still taps into effects of change in longitudinal studies—*between-person differences in change*. It is interpreted that persons who score higher in dyadic coping behaviors compared with persons who score lower can exhibit change in relationship satisfaction, which is a process among across-time (days, months or years) averages (Hoffmann, 2015; Sliwinski & Buschke, 2009). Prior longitudinal studies relative to dyadic coping processes have primarily explored between-person differences in change (Bodenmann et al., 2006; Merz et al., 2014). Second, because within-person components are predominately analyzed in longitudinal research, thus we need to distinguish *within-person fluctuation* and *within-person change*. Within-person fluctuation refers to a short-term process of variations over repeated measurements across days, months and years. Time is only a method of deriving multiple assessments for persons and thus fluctuations in behaviors are expected rather than the systematic change of behaviors. For instance, couples exhibit fluctuations in communicating stress to partners over days and their sense of relationship satisfaction will vary over days as well. In contrast, within-person change refers to a long-term process of change as a consequence of time. Time is an index of process accounting for the systematic change. Couples who communicate stress to partners on days of need may feel satisfied with their relationship in the long run.

In sum, analyses of between-person differences and within-person fluctuations contribute to explain the short-term mechanisms of couples' stress and dyadic coping

processes in general and across daily situations. On the another hand, analyses of between-person change and within-person change generate insights into the long-term mechanisms of how couples' stress and dyadic coping processes exert positive or negative influence on their relationship satisfaction over time. As such, there is a great need to utilize the STM to consider couples' stress and dyadic coping processes across all these levels of analysis.

4.1.2 Conceptual and methodological issues of between-and within-person components

On related note, between-and within-person components allow us to capture different sides of couples' stress and dyadic coping processes postulated by the STM. Therefore, we need to separate between-and within-person components both conceptually and methodologically to address their corresponding expectations (Brose et al., 2015; Curran & Bauer, 2011; Hoffmann, 2015). Conceptually, in examining couples' stress and dyadic coping processes, we should predict differential effects of between-and within-person components on relationship functioning and consider the contextual effects between these two effects (Raudenbush & Bryk, 2002). Between-person components contain aggregate effects by simply comparing behaviors across persons which also may exert influence on within-person components exploring behavioral variabilities and change within processes over time. For example, even if we are interested in how a partner provides support to their stressed spouse on days of stress, it is likely that average supportive dyadic coping one partner provides would have an additional effect on this process. Thus, we need to quantify how much outcomes (relationship satisfaction) can be explained by between-person or within-person components.

Methodologically, we need to make a clear distinction for stress-coping behaviors occurring between persons or transpiring within persons over time. First, previous studies based on the STM always interpret between-person effects as within-person effects by analyzing data derived from cross-sectional studies or aggregating across-time averages in

longitudinal studies. Second, such mixture of between-and within-person effects does not allow us to get an accurate and precise understanding of couples' stress and dyadic coping processes across everyday stressful situations. These processes entail two hierarchical levels: (a) the couple level and (b) the everyday level, where couples are nested within days. The nested structure or data should be analyzed with multilevel models based on multiple assessments of variations in stress and dyadic coping processes (e.g., daily dairy study, Curran & Bauer, 2011; Hoffmann & Stawski, 2009). Therefore, we clearly avoid confounds of between-and within-person effects of behaviors on relationship functioning through assessing the variability in the magnitude between individuals as well as day-to-day variabilities across time. In addition, we can test whether these two levels of effects are dependent or independent through comparing these two effects and testing cross-level effects (e.g., the additive or interactive effect of between-person variables on the within-person associations).

4.2 An extended model for the processes of STM

In this part, the thesis sketches out an extended model for the processes postulated by the STM from the perspective of between-and within-person components. This new model can be applied not only in explaining behaviors between persons (e.g., East and West couples, distressed and non-distressed couples), but also in explaining time-varying and situation-specific behaviors within persons (e.g., couples' stress reactivity and dyadic coping across situations from a specific culture). Three processes of the STM would be discussed and extended: stress spillover, stress communication and supportive dyadic coping[2].

4.2.1 Stress spillover

As suggested by the STM (Bodenmann, 2005), external stressors can transmit from

[2] Although common dyadic coping is an essential component proposed by the STM, yet it is beyond the scope of the current thesis as we mainly explore how Chinese couples react to stress and therefore engage in providing support to their partners. The potential application of the extended model to common dyadic coping is discussed in the limitation part.

work or other social settings to couples' family life and negatively decrease couples' relationship satisfaction. In general, as stressors have detrimental effects on individuals' mental and physical health at the between-person level (e.g., Thoits, 2010), couples who score higher in their experiences of daily external stressors would be less satisfied with their relationship in comparison with couples who score lower. In this step, it is predicted that couples' relationship satisfaction in two groups (e.g., Swiss and Chinese) is determined by mean differences on average stress level. At the within-person level, as the STM suggests that contextual factors (e.g., culture, living environments) affect whether and to what extent daily situations are seen as stressful (Bodenmann, 1995), it is predicted that couples' relationship satisfaction (either Swiss or Chinese) is determined by today' stressful situations which they encounter in their residence. On days of situations that are seen as stressful, couples would feel extremely less satisfied with their relationship in comparison with days when couples experience situations that are seen as less stressful. In particular, couples' stress reactivity at the within-person level might be influenced or varied by their general stress level, which suggests a significant point in comparing effects and testing cross-level interactions across these two levels of analysis. Therefore, stress spillover processes are viewed not only as couples' trait-like behaviors between persons but also as situation-based behaviors occurring within persons.

4.2.2 Stress communication

In accordance with the STM, the stress communication process in couples suggests a typical within-person mechanism rather than a between-person mechanism (Bodenmann, 2005), because it highlights the transactional exchange between Partner A and Partner B. When examining behavioral differences between persons from diverse groups, it is assumed that at the between-person level, individuals who in general communicate stressors to their partners (or score higher in stress communication behaviors) would be satisfied with their

relationship in comparison with individuals who seldom communicate stressors to their partners (or score lower). Under this framework, we compare stress communication behaviors between Swiss and Chinese couples or younger and older couples. By contrast, at the within-person level, it is assumed that individuals who communicate stressors to their partners more often than usual or on days of stress would be more satisfied with their relationship in comparison with individuals who do not disclose themselves to their partners across days. Across everyday situations, if Partner A has experienced an extremely stressful day, he or she communicates their feelings and solicits help from Partner B and they would feel cared and validated through intimate relationship. Under the within-person framework, we examine whether Swiss or Chinese spouses would vary in self-disclosure to their partners when exposed to stressors they may encounter in their country respectively. In addition, as chronic or daily stressors have pile-up or prolonged effects on individuals and couples (Almeida, 2005; Randall & Bodenmann, 2009), average stress communication behaviors can exert influence on the within-person and situation-specific association between todays' stress communication and relationship satisfaction (e.g., cross-level effects).

4.2.3 Providing support to partners

Once the stress communication process is initiated, partners may respond to the support-seeker in a number of ways as suggested by the STM (e.g., supportive dyadic coping, delegated dyadic coping)[3]. In this part, supportive dyadic coping would be primarily illustrated to understand dyadic coping processes in couples in that it has been widely explored and was found to be a stronger predictor of relationship outcomes than other forms of dyadic coping (Cohen & Wills, 1985; Cutrona, 1996; Falconier et al., 2015).

Supportive dyadic coping is positively associated with relationship outcomes through

[3] Of note, partners may respond to the support-seeker in negative forms (e.g., negative dyadic coping, Bodenmann, 2005) in case that partners are not capable of providing support or tired of providing support to their partners for a long time. Such mechanism can also occur at between-and within-person levels. Future studies might further explore this point under the framework of the extended STM.

two mechanisms: direct effects and stress-buffering effects. *Direct effects* are simply interpretable in stress-coping processes, regardless of stress level. At the between-person level, stressed partners who receive more support from their spouses are more satisfied with their relationship in comparison with partners who receive less support. At the within-person level, stressed partners who receive more support than usual from their partners on days of stress or across daily stressful situations are especially satisfied with their relationship in comparison with partners who receive less support. As such, it is unknown which levels of component matter more for couples; therefore, comparing these two levels of analysis would facilitate a more detailed and precise understanding of the effect. Meanwhile, as the STM and previous studies regard partners' support dyadic coping as trait-like components for couples, it is assumed that partners' state-like dyadic coping is dependent on partners' trait-like and average dyadic coping.

The *stress-buffering* effect is the main mechanism of dyadic coping, although there are studies reporting that supportive dyadic coping mediates associations between relationship-related variables and relationship outcomes (e.g., Rusu et al., 2015; Vedes et al., 2016). It predicts that partners' dyadic coping behaviors buffer the negative influence of stressors on relationship outcomes. At the between-person level, it is assumed that for partners with a rather higher level of stress, if their partners provide support to them, they would be satisfied with relationship in general in comparison with partners who receive less support. At the within-person level, partners' supportive dyadic coping buffers the negative effect of stress on days when a partner experiences a rather higher level of stress than usual. The within-person phenomenon predominantly emphasizes the nature of supportive dyadic coping. If partners provide support to their stressed spouses in terms of today's stressful experiences that make them feel annoyed and upset, their closeness and intimacy would be greatly enhanced, which in turn leads to spouses' perception of higher levels of relationship

satisfaction[4].

[4] Although dyadic coping is conceptualized into problem-and emotion-focused dimensions (Bodenmann, 1995, 2005), yet in the current thesis these two dimensions are not differentiated for the simplicity and comprehension as it is for the first time that the STM is extended to be examined at between-and within-person levels. In the limitation parts, the issue of distinguishing these two dimensions is further discussed.

5 Stress and coping processes in Chinese couples

In this part, the thesis aims to systematically apply the STM and its extended model to Chinese couples. Although Chinese couples' stress-coping processes are thought to be distinct from processes in Western couples in terms of cultural aspects (e.g., communication styles, family values, the gender role, Xu & Hiew, 2016), yet the models not only serve to explain behavioral differences between Chinese and Western couples, but also how Chinese couples react to stress and engage in dyadic coping across their daily situations over time. Below, the thesis outlines the cultural considerations in interpreting Chinese couples' stress and dyadic coping processes.

5.1 Couples' relationships in China

In understanding couples' relationships in China, we need to look at three significant aspects influencing Chinese couples' behaviors. First, two behavior guidelines, Confucianism and collectivism, shape Chinese perceptions and values towards marriage and family. Confucianism encourages *Xian Dao* (filial piety), which lays emphasis on producing heirs and investing their energy in caring for their elders and children rather than couples' relationships (Ebrey, 2006). China has been identified as a highly collectivistic country (see Oyserman, Coon, & Kemmelmeier, 2002) and collectivistic cultures demand people to work harmoniously within a network of interdependent relationships and fulfill one's role and obligations (Markus & Kitayama, 1991). Second, these two cultural doctrines further exert great influence on couples' communication behavior. In contrast to the direct, explicit statements of thoughts and feelings that are considered good communication in Western countries, Chinese consider good communication to be *Han Xu* (contained, reserved, implicit and indirect; Gao & Ting-Toomey, 1998). Chinese are socialized to suppress their emotions and express ideas hesitantly in order to be able to negotiate meaning with their conversational partner and retreat if necessary to preserve relationship harmony (Gao & Ting-Toomey,

1998). Third, the Confucius family values set a clear gender-based family life mode for Chinese couples: husbands are breadwinners and should be seen as the head in the family, whereas wives are responsible for the household and parenting (Ebrey, 2006; Zuo, 2003).

Nevertheless, as we live in a progressive and changing society, societal changes will simultaneously impact on couples' perceptions and behaviors. Since three decades, China has undergone great societal and even cultural shifts due to the rapid economic development (Shek, 2006; Xie, 2011). Economic development leads to direct impact of Western and individualistic values on traditional Chinese values (Chen, 2015; Devrin, 2011). Chinese people become more self-reliant and independent and show great concern of their own personal well-being (e.g., Su & Wang, 2010; Peppas, 2004). For instance, studies demonstrate that Chinese men and women can endorse individualistic views of relationships and family values when getting married (Chen, 2015) and Chinese' subjective well-being is positively associated with their view of individualism (Steele & Lynch, 2013). Therefore, as culture is not stable and its values and practices shift and change over time (Gjerde, 2004), we need to take into account influences of social environment and daily situations in understanding Chinese couples' stress and dyadic coping processes.

5.2 Stress and coping processes in Chinese couples

5.2.1 Stress spillover

Several studies have examined how stress was negatively associated with Chinese couples' relationship functioning. For example, studies reveal that various external stressors, from affording to a flat (Chen, Hao, & Stephens, 2010), suffering pollution (Gan, 2003), and experiencing heavy workload (Zhang, Foley, & Yang, 2013), to bearing a financial burden (Lam, 2011), have been seen as decreasing Chinese couples' life or relationship satisfaction. However, all these studies focused on one aspect of daily stressors without considering the prolonged and pile-up effect of daily external stressors on couples; therefore, results do not

allow us to make inferences about the effects of everyday stress. In addition, all these studies only provide an insight into behavioral differences between persons (between-person analyses). It is imperative to get to know how Chinese couples react to stress across daily stressful situations over time. The thesis would further explore Chinese couples' stress spillover mechanisms based on the STM and its extended model.

5.2.2 Stress communication

Until now, there is no study examining Chinese couples' stress communication behaviors and it remains unknown how they initiate the process. But for individuals, several studies show that Asians seek less support in comparison with Americans because they fear that seeking support might augment burden on close others and disturb the relational harmony with them (e.g., Taylor, 2011; Kim, Sherman, & Taylor, 2008). Regardless of the knowledge, there are several gaps between the reported results and the actual phenomena. First, because the stress communication process is a transactional exchange between the support-seeker and the support-provider, previous studies just simply compared Asians and Americans' behavioral differences and drew assumptions about why Asian sought less support. Thus, no study has actually examined how the seeker' stress communication affects their own relationship outcomes and the provider' relationship outcomes. Second, most studies used designs where participants have to imagine certain scenarios in laboratory settings and report if they potentially would communicate stress in framed conditions and situations. In this case, studies do not allow us to capture real-life behaviors of people. One solution to overcome these problems is to study Asian couples using a daily diary design. In this way, the thesis examines how Chinese couples communicate stress to their partners and its corresponding relationship outcomes for both spouses from between-and within-person processes.

5.2.3 Providing support to partners

Current evidence relative to stress-buffering effects of social support or spousal support in Chinese leads to mixed results. There are studies based on individuals or couples reporting that spousal support can buffer the negative effect of stress on relationship outcomes (e.g., Chi et al., 2011; Chen & Li, 2007). On the other side, counterintuitively, there is a cross-sectional study reporting social support mediated the association between work-family stress and marital satisfaction (Liu, Hang, & Cheung, 2016). One possible explanation is that between-and within-person effects are mixed in cross-sectional studies (Hamaker et al., 2012). To further understand stress-buffering effects of social support or dyadic coping on Chinese couples, it is necessary to conduct more profound studies (e.g., multiple assessments) based the STM and its extended model.

6 Research questions and study designs

The present thesis aims to extend forgoing empirical studies to further understand couples' stress-coping mechanisms based on the STM and its extended model. In the first part (Study 1 to Study 3), the thesis reported three cross-sectional studies contributing to test the psychometrics of the DCI in Chinese and apply the STM to Chinese couples. These studies sought to rigorously validate the DCI in an Eastern language, compare behavioral differences between Western and Eastern couples as well as unpack how Chinese couples react to stressors and engage in dyadic coping behaviors at the between-person level. In the second part (Study 4 to Study 5), based on the extended STM outlined in Chapter 4, the thesis reported two intensive longitudinal studies contributing to explore daily fluctuations in stress spillover, stress communication and supportive dyadic coping behaviors in Chinese couples. Compared with prior cross-sectional, between-person studies, these two studies sought to investigate the dual effects of stress communication (support mobilization) on the support-seeker and the support-provider as well as the direct and stress-buffering effects of supportive dyadic coping on relationship satisfaction in Chinese couples by disentangling between-and within-person effects.

Study 1

In the first study, as previous studies demonstrate inconsistencies in the DCI' psychometrics properties, we sought to validate the Chinese version of the DCI by examining three corresponding aims: (a) factorial structure, (b) measurement invariance of the factorial structure and (c) construct validity of DCI test scores by using samples from three cultures (Chinese, Swiss and the U.S.). Meanwhile, to understand behavioral differences between cultures we made latent means comparisons between Chinese-Swiss and Chinese-U.S. couples' dyadic coping behaviors. Self-reported data consisting of 474 Chinese couples, 330 Swiss couples and 969 Americans who were dating or married with their partners was

analyzed with the methods of structural equal modelling (SEM), multi-group SEM and multi-trait multi-method approach.

Study 2

In the second study, given the apparent utility of the STM for understanding Chinese couples coping with stress and the absence of research in this area, we conducted the study of examining dyadic coping behaviors in Chinese couples and the associations between these behaviors and relationship satisfaction by using the validated Chinese version of the DCI (Study 1) and the Relationship Assessment Scale (Hendrick, Dicke, & Hendrick, 1988). Self-reported data from 474 Chinese couples was analyzed based on sociodemographic characteristics.

Study 3

In the third study, to supplement Study 2' correlational evidence, we aimed to examine associations among external stress, internal stress, positive dyadic coping and relationship satisfaction based on the STM and previous studies utilizing Western couples (e.g., Bodenmann et al., 2007; Hilpert et al., 2015). Simultaneously, we examined the gender differences in the tested model. Self-reported data from 474 Chinese couples was analyzed with the method of actor-partner interdependence model (APIM).

Study 4

Even if previous studies examining Asians' support seeking behaviors argue that Asians use less support than Westerners (Kim et al., 2008), yet all of these studies did not actually test the effects of support seeking on the support-seeker and the support-provider in real-life interactions. Thus, in the fourth study, under the framework of the extended STM, we conducted the first study to examine the short-and long-term effects of stress communication behaviors (support mobilization) between the support-provider and the support-seeker (Chinese couples) on their relationship satisfaction. To disentangle short-term

between-and within-person effects, we made use of daily dairy design where 84 pairs of dual-earner Chinses couples were recruited to complete diaries (daily stress, daily support mobilization and daily relationship satisfaction) every evening for 7 consecutive days. In regards to examine long-term between-and within-person effects, we made use of diary data and one year follow-up data relative to relationship satisfaction.

Study 5

In the fifth study, under the framework of the extended STM, we aimed to examine the stress spillover and the direct and stress-buffering effects of supportive dyadic coping on Chinese couples' relationship satisfaction at between-and within-person levels. For stress spillover, we examined how daily stress might impair Chinese couples' relationship satisfaction on average and across daily situations. For effects of supportive dyadic coping, the two postulated mechanisms were profoundly examined. We not only examined how partners' supportive dyadic coping might influence their spouses' relationship outcomes irrespective of stress level in general and across days, but also investigated how partners' supportive dyadic coping would covary with daily stress to predict relationship outcomes in general and across days. The same method and dataset (Study 4) would be used to disentangle between-and within-person effects. Meanwhile, disentangling these two levels of analysis allow us to compare the magnitude of between-and within-person relationships and test interaction effects between the two levels.

7 Study 1 Validation of the Dyadic Coping Inventory with Chinese Couples: Factorial Structure, Measurement Invariance, and Construct Validity[5]

Abstract

The Dyadic Coping Inventory (DCI, Bodenmann, 2008) assesses how couples support each other when facing individual (e.g., workload) and common (e.g., parenting) stressors. Specifically, the DCI measures partners' perceptions of their own (*Self*) and their partners' behaviors (*Partner*) when facing individual stressors, and partners' common coping behaviors when facing common stressors (*Common*). To date, the DCI has been validated in six different languages from individualistic Western cultures; however, as culture can affect interpersonal interactions, it is unknown whether the DCI is a reliable measure of coping behaviors for couples living in collectivistic Eastern cultures. Based on data from 474 Chinese couples (N = 948 individuals), the current study examined the Chinese version of the DCI's factorial structure, measurement invariance, and construct validity of test scores. Using three cultural groups (China, Switzerland, and the United States), confirmatory factor analysis revealed a 5-factor structure regarding *Self* and *Partner* and a 2-factor structure regarding *Common* dyadic coping. Results from analyses of measurement invariance indicated that the DCI subscales met the criteria for configural, metric, and full/partial scalar invariance across cultures (Chinese-Swiss and Chinese-U.S.) and genders (Chinese men and women). Results further revealed good construct validity of the DCI test scores. In all, the Chinese version of the DCI can be used for measuring Chinese couples' coping behaviors, and is available for cross-cultural studies examining dyadic coping behaviors between Western and Eastern cultures.

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[5] This study was published in Psychological Assessment.
Xu, F., Hilpert, P., Randall, A. K., Li, Q., & Bodenmann, G. (2016). Validation of the dyadic coping inventory with Chinese couples: Factorial structure, measurement invariance, and construct validity. *Psychological Assessment*. http://doi.org/10.1037/pas0000329

Introduction

Research consistently shows that individuals' stressful experiences are closely associated with mental and physical health problems, such as mood disorders (e.g., depression) and poor immune and cardiovascular system functioning (e.g., Larzelere & Jones, 2008; Thoits, 2010). Stressful experiences can spill over into one's romantic relationship, negatively affecting partners' relationship behaviors and outcomes (Buck & Neff, 2012; Randall & Bodenmann, 2009). However, such negative spillover effects can be reduced if couples are capable of coping with the stress together, which is referred to as dyadic coping (Bodenmann, 2005). Findings over the last decade show that dyadic coping (DC) is positively associated with relationship satisfaction as well as physical and psychological well-being (e.g., Bodenmann, Pihet, & Kayser, 2006; Bodenmann, Meuwly, & Kayser, 2011; Papp & Witt, 2010).

The 37-item Dyadic Coping Inventory (DCI; Bodenmann, 2008) was developed to measure DC behaviors within couples, and is the most widely used measure to assess DC behaviors (see the meta-analysis by Falconier, Jackson, Hilpert, & Bodenmann, 2015). The original German version of the DCI has been translated into 16 languages (Simmons & Lehmann, 2012) and has been validated in six languages (see Table 1). To date, all validation studies have been carried out in Western cultural contexts. As culture can affect interpersonal interactions (Kim, Sherman & Taylor, 2008), it is unknown whether the DCI is an adequate measure of stress and coping processes in Eastern cultures, such as China. Therefore, the aim of the present study was to validate the Chinese version of DCI.

Table 1
Summary of Prior DCI validation Studies

Citation	Language	Sample	Factorial Structure	Construct Validity	Measurement Invariance	Analysis	Items
Bodenman (2008)	German	Individuals	4 / 1	RAS; COPE	-	EFA	All items
Donato et al. (2009)	Italian	Couples	5 / 2[a]	-	-	CFA	All items
Ledermann et al. (2010)	German, Italian, French	Individuals	4 / 1	PQ; CPQ	-	CFA	2 items deleted in the Italian and French sample (2, 17)
Falconier et al. (2012)	Spanish	Couples	5 / 2	CSI; DAS; CTS-R	-	CFA	7 items deleted (2, 3, 15, 17, 18, 23, 26)
Vedes et al. (2013)	Portuguese	Individuals	5 / 2	RAS; B-SRQ	Across genders	CFA	All items
Levesque et al. (2014)	English	Couples	4 / 1	DAS	-	EFA, CFA	7 items deleted (2, 3, 8,17, 18, 23, 35)
Randall et al. (2015)	English	Individuals	5 / 2	RAS; COPE	Across genders and cultures (U.S.– Swiss)	CFA	6 items deleted (2, 3, 9,17,18, 24)

Note. a = indicates that the Italian version was validated on the basis of the old version of DCI with 39 items across *Self*, *Partner* and *Common* which contains an additional factor (2 items) for *Common* DC. 4 / 1 = 4-factor and 1-factor structure; 5 / 2 = 5-factor and 2-factor structure; RAS = Relationship Assessment Scale; COPE = Coping Orientations to Problems Experienced Scale; PQ = Partnership Questionnaire; CPQ = Communication Pattern Questionnaire; CSI = Coping Strategies Inventory; DAS = Dyadic Adjustment Scale; CTS-R = Conflict Tactics Scale-Revised; B-SRQ = Brief Sound Relationship Questionnaires; EFA = exploratory factor analysis; CFA = confirmatory factor analysis.

A Cultural Perspective of Chinese Couples' Stress and Coping Behaviors

Chinese marital culture has been fundamentally shaped by Confucianism and collectivism (Ebrey, 2006; Marshall, 2008). Confucianism emphasizes the importance of marriage and family, which are seen as the foundation of social harmony (Huang & Grove, 2012). Maintaining functional relationships and family harmony are thought to be achieved by fulfilling prescribed gender roles. Typically, husbands take on the responsibility of holding a career, whereas wives take care of the children and manage daily household tasks (Huang & Grove, 2012; Wang, Schoebi, & Perrez, 2010). Because of the focus on prescribed gender roles, women in Chinese society may provide more support to their male partners during times of stress (Chen & Li, 2007).

Collectivism is associated with the aim of achieving interpersonal harmony by sacrificing one's own goals for the benefit of the group's goals (Osyerman, Coon, & Kemmelmeier, 2002). Furthermore, in accordance with Chinese familial harmony, partners are expected not to share personal problems and stressful experiences (Kim. Sherman, & Taylor, 2008; Taylor et al., 2004). Given this, stress and coping processes in Chinese couples may be different when compared to couples from more Westernized and individualistic cultures, which place more of an emphasis on individual goals and personal benefits (Osyerman et al., 2002).

In the last three decades, China has undergone remarkable social and economic developments, which in turn has influenced modern life for Chinese families (Hesketh, Lu, & Xing, 2005; Lu, 2006; Shek, 2006; Zhang, Foley & Yang, 2013). Moreover, although economic reforms have improved living standards, Chinese couples face issues related to economic stress (Quek & Knudson-Martin, 2006) and work-family conflicts (Choi, 2008; Zhang et al., 2013). For example, financial hardship (i.e., financial stress) is forcing most couples to become dual-career

couples (Quek & Knudson-Martin, 2006). As a result of the new dual-career model, the traditional model of the support-seeker (husbands as breadwinners) and the support-provider (wives as housewives) is changing, which in turn could affect couples' stress and coping behaviors. Thus, there is a need for a well-validated coping measure with sound psychometric properties to assess and interpret Chinese couples' coping behaviors.

The Dyadic Coping Inventory (DCI)

The original German version of the Dyadic Coping Inventory (DCI; 37 items) was developed to assess how partners help one another cope with individual stressors (e.g., workload) as well as how partners cope together with common stressors (e.g., parenting; Bodenmann, 2008). The DCI is comprised of 5 factors related to individual stressors and 2 factors related to common stressors. The 5 factors related to individual stressors include: (a) *Stress Communication*; (b) *Emotion-focused Supportive* DC (i.e., expressing understanding); (c) *Problem-focused Supportive* DC (i.e., giving advice); (d) *Delegated* DC (i.e., helping the partner with their responsibilities), and (e) *Negative* DC (i.e., mocking or ignoring the partner's problems). For each of the 5 factors, participants rate their self-reported behaviors *(Self;* 15 items in total) and their perceptions of partner's behaviors (*Partner;* 15 items in total). As such, item contents and number of items per factor are equivalent across *Self* and *Partner*. The 2 factors related to common stressors include: (a) *Emotion-focused Common* DC (i.e., sharing emotions when suffering common stress) and (b) *Problem-focused Common* DC (i.e., working out solutions for common stress mutually). Thus, partners rate how they and their partners engage in DC when faced with common stressors (*Common* DC; 5 items). The DCI includes two additional items that specifically evaluate self-rated satisfaction with the employment of DC strategies; however, these two items are generally excluded from validation studies because they do not assess any theoretically conceptualized DC behaviors (e.g., Falconier, Nussbeck, & Bodenmann, 2012; Ledermann et al., 2010).

Prior studies have validated the DCI in different languages (see Table 1). Overall, three psychometric properties should be taken into account when validating the Chinese version of the DCI. First, two different solutions of the 37-item DCI's factorial structure have been reported. Using confirmatory factor analysis (CFA) or exploratory factor analysis (EFA), three studies proposed the theoretically suggested 5-factor solution for *Self* and *Partner* and 2-factor solution for *Common* DC (35 items, e.g., Falconier et al., 2012), whereas another three studies reported a 4-factor solution for *Self* and *Partner* and 1-factor solution for *Common* DC (35 items, e.g., Ledermann et al., 2010) [6]. In the latter solution, items from the two subscales of *Problem-* and *Emotion-focused* DC *by Self and Partner* have been combined into a single factor for the 4-factor structure (labeled as *Supportive* DC; 5 items); and items from the two subscales of *Problem-* and *Emotion-focused* DC have been combined for the 1-factor structure (labeled as *Common DC*; 5 items). In addition, not all previous validation studies validated all items in their CFA or EFA models, indicating that some items did not load on conceptually expected latent factors. Two studies validated the complete 37-item DCI (Bodenmann, 2008; Vedes, Nussbeck, Bodenmann, Lind, & Ferreira, 2013), whereas four studies excluding different numbers of items (range: 2-7; Falconier et al., 2012; Ledermann et al., 2010; Levesque, Lafontaine, Caron, & Fitzpatrick, 2014; Randall, Hilpert, Jimenez-Arista, Walsh, & Bodenmann, 2015). Excluding items resulted in an unequal amount of items for the final solution across *Self* and *Partner*. Given these inconsistencies, it is necessary to find a common factorial structure which applies to both Western and Eastern people.

Second, confirming measurement invariance (MI) is a critical step for validating an instrument, as diverse cultural groups may interpret psychological phenomena differently due

[6] The Italian version was validated on the basis of the old 41-item Dyadic Coping Questionnaire by testing 2 additional items for *Negative* DC and 2 additional items for *Common* DC (Donato et al., 2009) and these 4 items were dropped in the widely used 37-item DCI by the original author (Bodenmann, 2008).

to cultural characteristics (Schwarz et al., 2014). Thus far, only the English (Randall et al., 2015) and Portuguese (Vedes et al., 2013) DCI validation studies have tested for MI across genders, providing evidence for full configural, metric, and scalar invariance in the 5-factor and 2-factor solution. Moreover, Randall and colleagues (Randall et al., 2015) further tested for MI across cultures (U.S.–Swiss) and results supported full configural, metric invariance and partial scalar invariance.

Third, it is important to examine construct validity of the DCI test scores. Prior DCI validation studies have tested construct validity of DCI test scores by correlating DCI subscales to other measures, such as relationship satisfaction (convergent validity) and individual coping (discriminant validity). As the DCI assesses husbands' and wives' behaviors from self-rated as well as from partner-rated perspectives, construct validity of the DCI test scores (i.e., convergent and discriminant validity) is best tested using a Multitrait-Multimethod Matrix (MTMM, Campbell & Fiske, 1959).

Present Study

The present study sought to validate the Chinese version of the DCI by examining three corresponding aims: (a) factorial structure, (b) MI of the factorial structure and (c) construct validity of DCI test scores. First, to determine the best-fitting model, the factorial structure was examined by comparing the 5-factor and 2-factor solution and the 4-factor and 1-factor solution within samples from three countries: China, Switzerland (where the DCI originated), and the U.S. (where our measure was translated from). In order to find the best fitting model, we compared models with 5-factor and 2-factor solution and the 4-factor and 1-factor solution using all items as well as dropping items that have been found problematic in prior studies (e.g., Randall, et al., 2015). It is crucial to note that the factorial structure of the Chinese version of the DCI should uphold the same structure between cultures in order to further test for MI across cultures and genders.

Second, in order to test for MI, we conducted several CFA analyses to determine whether the DCI constructs were equivalent to configural, metric, and scalar invariance levels across cultures and genders. *Configural invariance* implies that the same factorial structure can be established across groups (i.e., culture and gender), indicating that samples from different groups interpret latent constructs in the same way. *Metric invariance* implies that factor loadings are equivalent for corresponding items across groups, indicating that a construct has similar meaning across groups and predictive associations with other constructs can be compared across groups (Schwarz et al., 2014). Additionally, *scalar invariance* examines whether each item has the same item intercept across groups, indicating that latent factor means across groups can be directly compared (Groth-Marnat, 2009; Schwarz et al., 2014). Assuming all three types of MI can be confirmed, this would provide evidence that items and constructs of the DCI are not unique to Western couples; rather, this would indicate that the DCI is also a valid measure for Chinese couples.

Finally, we used the MTMM approach (Campbell & Fiske, 1959) to test for construct validity of the DCI test scores. This approach allowed us to examine for (a) *convergent validity*: whether a trait (e.g., husbands' *Stress Communication*) can be captured across different methods (*Self*-versus *Partner*-ratings), (b) *discriminant validity*: whether each trait comprises a unique variability and, therefore, each trait is distinct from each other, and (c) *method variance*: whether the variability between traits is attributed to either the individual trait or to different methods of assessment (Davis, 1971). In order to test for convergent validity, discriminant validity, and method variance, three MTMM matrices were computed for husbands' behaviors (DC by *Self* and *Partner*), wives' behaviors (DC by *Self* and *Partner*), and their *Common* DC behaviors.

Method

Participants and Procedure

Data were collected from a convenience sample of heterosexual couples from three metropolitan cities (Beijing, Shanghai, and Guangzhou) and several provinces (e.g., Guangdong, Jiangsu, Shanxi, and Jiangxi) in China. Participants were recruited by distributing flyers at parent meetings in schools and to administrative managers of different enterprises (civil institutions, companies, schools and hospitals). Participants had to meet the following criteria in order to be able to participate: (a) married (legal age to marry in China is 22 years old for males and 18 years old for females) and (b) currently living with their spouses. Interested participants who met the inclusion criteria contacted research assistants via e-mail or phone and were then sent a letter including information about the study, two participation agreements, two sets of questionnaires, and two pre-addressed and stamped envelopes. Couples were instructed to sign the participation agreements, fill out their questionnaires independently, and send the scales back to the research assistant in separate envelopes. Participants were notified that their data would be kept anonymous and confidential for scientific purposes.

Approximately 600 couples showed interest in the study, and 501 couples (84 %) sent back the questionnaires. From 501 couples, data from 27 couples (5.4 %) were excluded because they either did not fill out the questionnaires or husbands' and wives' answers were identical. The final sample included data from 474 couples (N = 948 individuals). The husbands' mean age was 36.5 years (SD = 7.7) and the wives' mean age was 34.4 years (SD = 7.3). On average, couples had been married for 9.4 years (SD = 7.9). Eighty-four percent of all couples had at least one child (M =1.0, SD = .66, range 0-3). Approximately 17 % of husbands reported to hold a senior high school degree or other diplomas, 24 % reported that they received a three-year vocational college diploma, 40 % finished an undergraduate degree, and 19 % held a graduate degree. Approximately 17 % of wives reported a senior high school degree or other diplomas, 27 % reported that they received a three-year vocational college

degree, 38 % finished an undergraduate degree, and 18 % held a graduate degree. Husbands reported their employment as follows: 35 % work in civil and public institutions, 14 % work in state-owned enterprises, and 33 % work in private companies, while 17 % are self-employed. Wives reported their employment as follows: 38 % work in civil and public institutions, 14 % work in state-owned enterprises, and 36 % work in private companies, while 10 % are self-employed. Only 2 % of wives were unemployed and reported being housewives. On average, husbands earned a monthly salary of 6,000 to 10,000 CNY (approximately $1,000 to $1,600 USD during data collection in 2014), whereas wives earned around 2,000 to 6,000 CNY (approximately $350 to $930 USD)[7].

Swiss and U.S. Samples

To evaluate factorial structure and measurement invariance we utilized a sample of heterosexual couples from Switzerland and a sample of heterosexual individuals currently in a romantic relationship from the U.S. The Swiss sample included 330 couples (N = 660 individuals). Couples ranged in age from 18 to 65 years old (M_{men} = 41.4, SD = 9.2; M_{women} = 40.0, SD =9.0) and had been in a relationship for an average of 12.9 years (SD = 8.6). This data was collected in Switzerland for a randomized controlled trial (Bodenmann, Hilpert, Nussbeck, & Bradbury, 2014). The U.S. sample included 969 heterosexual individuals currently in a romantic relationship (29.4% men, 70.6% women). These individuals ranged in age from 18 to 75 years old (M_{men} = 32.1, SD =12.3; M_{women} = 33.2, SD =12.0). Participants reported being in a relationship with their partner for an average of 10.3 years (SD = 10.1). This data was used in the English validation study of the DCI (Randall et al., 2015).

Translation Procedures of the DCI

[7] According to reports released by the Ministry of Human Resources and Social Security of China in 2014, the average salary varies from city to city on the basis of the economy level. The average salary in the developed areas, like Beijing and Shanghai, can reach 4,000 to 8,000 CNY per month (around 600 to 1200 USD) while the average salary in less developed areas, like Western parts of China, just range from 1,000 to 2,000 CNY (around 150 to 300 USD). Thus, our participants' average salary falls into the category of the middle class.

We translated the Chinese version of the DCI from the English version (Randall et al., 2015), as researchers would like to accept a validated instrument in English (see Ziegler & Bensch, 2013). Furthermore, the English version has been validated with a Canadian sample with college students (Levesque et al., 2014) and a U.S. sample with individuals in a romantic relationship (Randall et al., 2015). To translate the English version of the DCI into Chinese we followed recommendations by Sireci and colleagues (Sireci, Wang, Harter, & Ehrlich, 2006). One Chinese-English translator and one Chinese psychology professor translated the English version of the DCI into Chinese, and then two bilingual translators (Chinese and English) back-translated the DCI separately. Translators only detected minor discrepancies (three sentences in Chinese) which were discussed and solved by mutual agreements. To guarantee full consistency of all items, the back-translated English version was checked by the author of the original instrument.

Measures

Dyadic Coping Inventory (DCI). The DCI (Bodenmann, 2008) is a self-report inventory of 37 items measured on a five-point Likert scale, ranging from 1 (*not at all/very rarely*) to 5 (*very often*). To assess couples' stress and coping behaviors, the DCI includes five subscales for the *Self* and corresponding subscales for the *Partner*: (a) *Stress Communication* by *Self* (e.g., "I tell partner openly how I feel and appreciate his/her support"; 4 items) and by *Partner* (e.g., "My partner tells me openly how she/he feels and appreciates my support"; 4 items); (b) *Emotion-focused Supportive* DC by *Self* (e.g., "I show empathy and understanding to my partner"; 3 items) and by *Partner* (e.g., "My partner shows empathy and understanding to me"; 3 items); (c) *Problem-focused Supportive* DC by *Self* (e.g., "I tell my partner that his/her stress is not that bad and help him/her to see the situations in a different light"; 2 items) and by *Partner* (e.g., "My partner helps me to see stressful situations in a different light"; 2 items); (d) *Delegated* DC by *Self* (e.g., "I take on things that

my partner would normally do in order to help him/her out"; 2 items) and by *Partner* (e.g., "My partner takes on things that I normally do in order to help me out"; 2 items) and (e) *Negative* DC by *Self* (e.g., "I blame my partner for not coping well enough with stress"; 4 items) and by *Partner* (e.g., "My partner blames me for not coping well enough with stress"; 4 items). The DCI also assesses two *Common* DC behaviors: (a) *Emotion-focused Common* DC (e.g., "We help each other relax with such things like massage, taking a bath together, or listening to music together"; 2 items) and (b) *Problem-focused Common* DC (e.g., "We try to cope with the problem together and search for ascertained solutions"; 3 items). Additionally, the DCI includes two additional items for assessing couples' satisfaction with the effectiveness of DC behaviors.

Data Analytic Strategies

Aim 1: Testing competing CFA models for factorial structure. In order to find the best-fitting model, we used CFA modeling to test competing DCI measurement models (5-factor and 2-factor vs. 4-factor and 1-factor) within three cultural groups (Chinese, Swiss, and U.S.) for both genders. Given that some items were problematic in the U.S. sample (Randall, et al., 2015), we relied on modification indices (MIs) and parameter estimates (PE) to provide information about potential model misfit (see Brown, 2015). Based on this information, we allowed items' error estimates to covary. Moreover, if statistically justifiable, we removed problematic items to achieve acceptable model fit in all samples (Brown, 2015). In order to test CFA models, we used the robust maximum likelihood estimator (MLR) adjusting for non-normally distributed data. The full information maximum likelihood (FIML) was used to handle missing data. We relied on common fit indices to evaluate model to data fit: χ^2, comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). Using a chi-square to test for differences between models is frequently used, however, this test is too sensitive for a large sample size

(N = 300; MacCallum, Browne, & Cai, 2006; Kline, 2011). Given this, we relied on the principle that χ^2/df ratio should be smaller than 3 (Schermelleh-Engel, Moosbrugger, & Muller, 2003) and made use of the alternative criteria (Akaike Information Criterion, AIC, see Brown, 2015) to compare models. A good or acceptable model to data fit is indicated by a CFI above .95, a RMSEA smaller than .08, and a SRMR smaller than .08 (Hu & Bentler, 1999; McDonald & Ho, 2002). Lower values of AIC indicate a better model fit than compared models (Brown, 2015).

Aim 2: Testing measurement invariance. We used the best-fitting factorial structure derived from Aim 1 to examine MI across Chinese-Swiss and Chinese-U.S. cultures for both genders. Specifically, we used a series of nested multi-group CFA models with increasing parameter constraints to test for configural, metric, and scalar invariance. Configural invariance was tested in a model where the factorial structure was invariant across groups with no equality constrains imposed, relying on common model fit indices (χ^2, CFI, RMSEA and SRMR; Chen, 2007; Schwarz et al., 2014). Metric invariance was tested by fitting models where factor loadings on respective items were constrained to be equal across groups. Scalar invariance was tested by additionally constraining intercepts to be equal across groups. In order to evaluate metric and scalar invariance models, we followed Chen's simulation study (2007), which suggests that ΔCFI, ΔRMSEA, and ΔSRMR could be used to inspect changes in model fit between nested models. The difference of fit indices between these models should be smaller than .010 for ΔCFI, .015 for ΔRMSEA, and .030 for ΔSRMR in a large sample size (N > 300; Chen, 2007). Given that full scalar MI models could not be found, we tested for partial scalar MI. We relied on the highest MIs to identify which item intercepts needed to be freely estimated (Brown, 2015), which would indicate that some but not all intercepts were found to be equivalent across groups. We followed Schwarz and

colleagues' (2014) suggestion that partial scalar invariance is still tenable if less than half of item intercepts are freely estimated.

In addition to MI analyses across cultures, we further examined MI across genders within the Chinese sample after restructuring the dyadic data. Following recommendations by Verhofstadt and colleagues (Verhofstadt, Buysse, Rosseel, & Peene, 2006), we randomly allocated couples to two groups and then selected women from one group and men from the second group. To avoid selection bias, we repeated this procedure 1,000 times and calculated average fit indices across models within the 1,000 sample.

Finally, given that full or partial scalar MI can be established, we tested whether latent means were significantly different between groups. One group was chosen as a reference group with its latent means fixed to zero (e.g., Chinese men) whereas factor means of the other group was freely estimated (e.g., U.S. and Swiss men; Schwarz et al., 2014).

Aim 3: Testing construct validity. The MTMM approach is based on a correlation matrix. We computed three correlation matrices (husbands' behaviors, wives' behaviors and *Common* DC behaviors) to test for convergent validity, discriminant validity, and method variance. Convergent validity can be confirmed if the validity correlation coefficients (monotrait-heteromethod) are different from zero (Campbell & Fiske, 1959) and exceed a minimum correlation of $r \geq .25$ (Zuo, Schimmak, & Gere, 2013). Discriminant validity can be confirmed if convergent validity coefficients (monotrait-heteromethod) are significantly larger than coefficients based on different traits and different methods (heterotrait-heteromethod) involving dependent correlations with a common index (e.g., comparing r_{12} with r_{13}; 84 comparisons). We used one-tailed Steiger's z-test (Steiger, 1980) to compare if traits are independent of each other. Finally, an influence of the method can be detected if the heterotrait-monomethod coefficients are significantly larger than the heterotrait-heteromethod

coefficients. This was also tested with one-tailed Steiger's z-test (Steiger, 1980; 42 comparisons).

The statistical software package R (R version 3.1; R core team) was used to compute descriptive statistics and correlation matrices. The lavaan package (Rosseel, 2012) in R was used to test all structural equation models (CFA and multi-group CFA) and the cocor package (Diedenhofen & Musch, 2015) to compare correlation coefficients.

Results

Aim 1: Testing Competing CFA Models for Factorial Structure

CFA models (35-item version) for the 4-factor and 1-factor solution as well as for the 5-factor and 2-factor solution were computed separately for each sample across both genders. Results revealed that the 4-factor and 1-factor solution did not fit the data well for both genders in three samples (see Table 2 and 3). For the Chinese sample, the 5-factor solution (where we separated the *Supportive* DC subscale into *Problem*- and *Emotion-focused Supportive* DC subscales) and the 2-factor solution (where we separated the *Common* DC subscale into *Problem*- and *Emotion-focused Common* DC subscales) yielded a good model to data fit. However, the 5-factor and 2-factor solution for Swiss and U.S. samples did not show adequate fit. After a closer examination of items, we found four problematical items from two subscales of *Stress Communication* by *Self* (item 2 and 3) and by *Partner* (item 17 and 18). Based on MIs and PE, we found that covariances between items in each subscale (*Self*/*Partner*) were extremely high for three samples: item 2 and 3 (e.g., U.S. men/ women: MIs = 26.20/28.57, PE = .26/ .17); item 17 and 18 (e.g., U.S. men/ women: MIs = 29.35/53.09, PE = .28/.29). Subsequently, we allowed error estimates of two pairs of items to covary. However, models still did not show satisfactory fit to the U.S., sample. (e.g., U.S. men: CFI = .93; U.S. women CFI = .92). In order to attain a common factorial structure for three samples and further test for MI across samples, we excluded four problematic items of

the *Stress Communication* subscale (two for *Self*, two for *Partner*). Excluding these items is further justified as they theoretically overlap with the *Delegated* DC subscale (e.g., "I ask my partner to do things for me when I have too much to do"). Therefore, we recomputed CFA models without these four items, resulting in satisfactory model indices across three samples for both genders (see Table 2 and 3). AIC values for the final 5-factor and 2-factor model across three samples for both genders were the lowest, further strengthening the robustness of final models. Thus, the 5-factor and 2-factor solution based on a 31-item version was used to test all subsequent steps. Figure 1 shows standardized factor loadings for final models (factor loadings for all studied models can be viewed in the supplemental material).

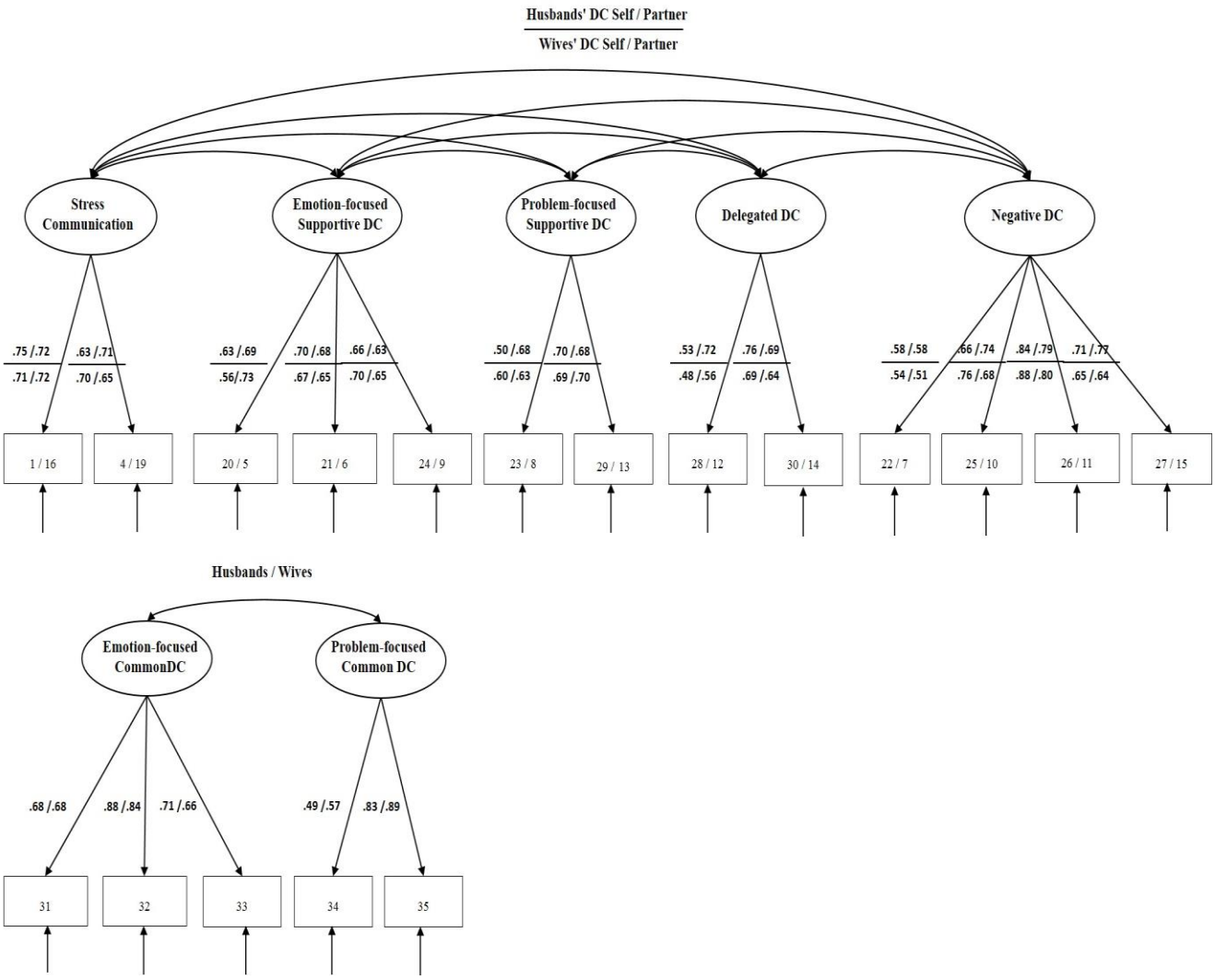

Figure 1. The standardized factor loadings for 5-factor structure for DC by *Self* (husbands & wives) and for DC by *Partner* (husbands & wives) as well as 2-factor structure for *Common DC* (husbands & wives). The two models are based on the final CFA models. 1/16 and likewise numbers refer to the items by *Self* and *Partner*, while 31 and likewise numbers refer to *Common* DC items. DC = dyadic coping.

Table 2
Fit Indices for CFA Models of DCI across Three Samples for Men

Models	Items	χ^2	*df*	CFI	SRMR	RMSEA(90% CI)	AIC	$\Delta\chi^2$
Chinese (*N* = 474)								
4-factor / Self	15	179.27	84	.930	.044	.049 (.040, .058)	17376	-
5-factor / Self	15	156.38	80	.945	.041	.045 (.035, .054)	17354	21.34
*5-factor / Self	13	104.61	55	.958	.036	.044 (.032, .055)	15033	51.92
4-factor / Partner	15	155.56	84	.955	.048	.042 (.033, .052)	17467	-
5-factor / Partner	15	124.87	80	.972	.043	.034 (.023, .045)	17438	32.25
*5-factor / Partner	13	84.29	55	.979	.039	.034 (.020, .046)	15236	40.59
1-factor / Common	5	47.70	5	.924	.054	.134 (.104, .167)	5604.1	-
*2-factor / Common	5	12.50	4	.985	.023	.067 (.030, .107)	5564.4	33.24
Swiss (*N* = 330)								
4-factor / Self	15	181.66	84	.918	.057	.057 (.046, .067)	12870	-
5-factor / Self	15	161.23	80	.932	.052	.053 (.041, .064)	12654	17.22
*5-factor / Self	13	84.59	55	.968	.037	.038 (.021, .054)	10895	75.11
4-factor / Partner	15	219.27	84	.900	.065	.066 (.056, .077)	13259	-
5-factor / Partner	15	180.63	80	.926	.061	.059 (.048, .069)	13025	39.13
*5-factor / Partner	13	71.18	55	.985	.032	.028 (.000, .045)	11213	110.81
1-factor / Common	5	86.43	5	.862	.094	.211 (.174, .250)	4417	-
*2-factor / Common	5	2.56	4	1.00	.013	.000 (.000, .065)	4333	66.15
U.S. (*N* = 285)								
4-factor / Self	15	221.13	84	.898	.069	.079 (.067, .091)	9573.4	-
5-factor / Self	15	153.85	80	.945	.057	.059 (.046, .073)	9509.7	84.87
*5-factor / Self	13	88.47	55	.973	.039	.048 (.029, .065)	8177.2	65.97
4-factor / Partner	15	272.79	84	.873	.074	.092 (.081, .104)	9831.1	-
5-factor / Partner	15	228.77	80	.900	.068	.084 (.072, .096)	9790.0	43.65
*5-factor / Partner	13	140.83	55	.945	.054	.077 (.062, .092)	8366.6	88.86
1-factor / Common	5	66.13	5	.857	.074	.212 (.175, .251)	3369.3	-
*2-factor / Common	5	9.9	4	.986	.023	.073 (.013, .132)	3291.0	39.38

Note. * indicates results for the final model; *df* = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square residual; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidential Interval; AIC = Akaike Information Criterion; $\Delta\chi^2$ = chi-square difference test. Two evaluation items (item 36 and 37) were excluded for the analysis and items (2,3,17,18) were deleted for testing final models.

Table 3
Fit Indices for CFA Models of DCI across Three Samples for Women

Models	Items	χ^2	*df*	CFI	SRMR	RMSEA(90% CI)	AIC	$\Delta\chi^2$
Chinese (*N* = 474)								
4-factor / Self	15	157.42	84	.952	.049	.043 (.033, .052)	17686	-
5-factor / Self	15	128.90	80	.968	.045	.036 (.025, .046)	17658	27.89
*5-factor / Self	13	92.66	55	.969	.044	.038 (.026, .050)	15502	35.73
4-factor / Partner	15	153.81	84	.952	.049	.043 (.033, .052)	18184	-
5-factor / Partner	15	141.20	80	.968	.045	.036 (.025, .046)	18178	13.09
*5-factor / Partner	13	86.69	55	.969	.044	.038 (.026, .050)	15900	55.17
1-factor / Common	5	68.36	5	.863	.061	.164 (.132, .197)	5713.7	-
*2-factor / Common	5	8.89	4	.989	.025	.051 (.000, .092)	5648.9	84.71
Swiss (*N* = 330)								
4-factor / Self	15	203.91	84	.908	.057	.062 (.052, .073)	13105	-
5-factor / Self	15	187.10	80	.918	.053	.060 (.050, .071)	13093	15.60
*5-factor / Self	13	114.61	55	.945	.042	.054 (.041, .068)	11405	73.04
4-factor / Partner	15	223.39	84	.928	.059	.068 (.058, .078)	13708	-
5-factor / Partner	15	181.90	80	.947	.054	.059 (.049, .070)	13667	34.86
*5-factor / Partner	13	92.65	55	.977	.037	.043 (.028, .058)	11942	89.90
1-factor / Common	5	117.39	5	.829	.105	.247 (.210, .287)	4473.8	-
*2-factor / Common	5	8.799	4	.993	.021	.057 (.000, .109)	4427.7	99.67
U.S. (*N* = 285)								
4-factor / Self	15	319.04	84	.890	.056	.066 (.059, .073)	22904	-
5-factor / Self	15	233.09	80	.929	.050	.054 (.047, .062)	22812	93.14
*5-factor / Self	13	97.49	55	.978	.031	.035 (.024, .045)	19453	139.05
4-factor / Partner	15	358.94	84	.921	.061	.072 (.065, .079)	23895	-
5-factor / Partner	15	275.30	80	.944	.058	.062 (.055, .069)	23798	77.12
*5-factor / Partner	13	129.08	55	.977	.031	.046 (.037, .055)	20343	153.23
1-factor / Common	5	162.89	5	.863	.083	.216 (.192, .242)	8245.5	-
*2-factor / Common	5	8.49	4	.997	.010	.035 (.000, .057)	8044.8	123.57

Note. * indicates results for the final model; *df* = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square residual; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% Confidential Interval; AIC = Akaike Information Criterion; $\Delta\chi^2$ = chi-square difference test. Two evaluation items (item 36 and 37) were excluded for the analysis and items (2,3,17,18) were deleted for testing final models.

Aim 2: Testing Measurement Invariance

MI across cultures. Analyses demonstrated good data fit for configural invariance across the Chinese-Swiss sample (see Table 4) as well as for the Chinese-U.S. sample (see Table 5), indicating that the best-fitting factorial structure was confirmed within three cultural groups. Furthermore, we found full metric invariance with satisfactory model indices for the Chinese-Swiss sample as well as for the Chinese-U.S. sample. Finally, we tested for scalar invariance by constraining item intercepts to be equal across groups. As most models differed significantly from metric invariance models, we allowed four intercepts with the highest MIs to vary freely for *Self* and *Partner* subscales (*Self*: items 23, 26, 22, 28; *Partner*: items 6, 7, 14, 15) and two intercepts to vary freely for the *Common* DC subscale (items 32, 33) for the Chinese-Swiss sample. Similarly, we allowed four intercepts with the highest MIs to vary freely for *Self* and *Partner* subscales (*Self*: items 3, 26, 28, 30; *Partner*: items 7, 8, 12, 14) and two items for the *Common* DC subscale (items 33, 35) for the Chinese-U.S. sample. Overall, further analyses showed that partial scalar invariance could be established. It is worth noting that scalar invariance can still be maintained if less than half of the intercepts are freely estimated (Schwartz, et al., 2014).

MI across genders. Table 6 shows results of MI analyses across genders (Chinese men and women) for the best-fitting model (5-factor and 2-factor solution, 31 items). Findings confirmed full configural, metric, and scalar invariance for *Self*, *Partne*r, and *Common* DC subscales. Results fully support the assumption that both Chinese husbands and wives respond to each item within each subscale in a similar way.

Table 4
Model Indices for Measurement Invariance across the Chinese-Swiss Sample

	Goodness-of-fit Indices					Comparison of Nested Model						
Invariance Types	χ^2	*df*	CFI	SRMR	RMSEA	Contrast	$\Delta\chi^2$	Δdf	ΔCFI	ΔSRMR	ΔRMSEA	*p*
Men						DC by Self						
1. Configural	190.75	110	.962	.037	.042							
2. Metric	202.10	118	.960	.040	.041	2 vs. 1	11.35	8	.002	.003	.001	.16
3. Full Scalar	384.97	126	.894	.056	.065	3 vs. 2	182.87	8	.066	.016	.024	.00
4. Partial Scalar	216.74	123	.956	.042	.043	4 vs. 2	14.64	5	.004	.002	.002	.01
						DC by Partner						
5. Configural	156.06	110	.981	.036	.032							
6. Metric	171.98	118	.978	.041	.033	6 vs. 5	15.92	8	.003	.005	.001	.05
7. Full Scalar	200.54	126	.970	.044	.038	7 vs. 6	28.56	8	.008	.003	.005	.00
						Common						
8. Configural	16.97	8	.993	.019	.052							
9. Metric	24.04	11	.990	.033	.053	9 vs. 8	7.07	3	.003	.014	.001	.08
10. Full Scalar	99.46	14	.936	.062	.120	10 vs. 9	75.42	3	.066	.029	.067	.00
11. Partial Scalar	24.36	12	.991	.033	.049	11 vs. 9	.32	1	.001	.000	.004	.57
Women						DC by Self						
12. Configural	205.57	110	.957	.043	.045							
13. Metric	233.34	118	.948	.050	.048	13 vs.12	27.77	2	.009	.007	.003	.00
14. Full Scalar	375.58	126	.886	.064	.069	14 vs.13	142.24	8	.062	.014	.021	.00
15. Partial Scalar	238.05	121	.947	.050	.048	15 vs.13	4.71	3	.001	.000	.000	.20
						DC by Partner						
16. Configural	179.01	110	.976	.038	.039							
17. Metric	202.09	118	.970	.046	.041	17 vs.16	23.08	8	.006	.008	.002	.00
18. Full Scalar	306.32	126	.936	.060	.059	18 vs.17	104.23	8	.034	.014	.018	.00
19. Partial Scalar	236.46	122	.959	.048	.047	19 vs.17	34.37	4	.011	.002	.006	.00
						Common						
20. Configural	19.63	8	.992	.023	.059							
21. Metric	30.96	11	.986	.039	.066	21 vs.20	11.33	3	.006	.016	.007	.02
22. Full Scalar	89.32	14	.947	.058	.113	22 vs.21	58.36	3	.039	.019	.047	.00
23. Partial Scalar	31.28	12	.987	.039	.062	23 vs.21	.32	1	.001	.000	.004	.57

Note. df = degrees of freedom; CFI = comparative fit index; SRMR = Standardized Root Mean Square residual; RMSEA = Root Mean Square Error of Approximation; DC = dyadic coping; $\Delta\chi^2$ = chi-square difference test. Items (2, 3,17,18) and two evaluation items (item 36 and 37) were excluded for the analysis.

Table 5
Model Indices for Measurement Invariance across the Chinese-U.S. Sample

	Goodness-of-fit Indices					Comparison of Nested Models						
Invariance Types	χ^2	*df*	CFI	SRMR	RMSEA	Contrast	$\Delta\chi^2$	Δdf	ΔCFI	ΔSRMR	ΔRMSEA	*p*
Men						DC by Self						
1. Configural	193.99	110	.965	.037	.045							
2. Metric	218.26	118	.958	.046	.048	2 vs. 1	24.27	8	.007	.009	.003	.02
3. Full Scalar	328.08	126	.916	.055	.066	3 vs. 2	109.82	8	.042	.009	.018	.00
4. Partial Scalar	240.50	123	.951	.048	.051	4 vs. 2	22.24	5	.007	.002	.003	.00
						DC by Partner						
5. Configural	222.58	110	.959	.044	.053							
6. Metric	234.48	118	.957	.046	.052	6 vs. 5	11.9	8	.002	.002	.001	.17
7. Full Scalar	287.94	126	.941	.050	.059	7 vs. 6	53.46	8	.016	.004	.007	.00
8. Partial Scalar	253.22	122	.952	.048	.054	8 vs. 6	18.74	4	.005	.002	.002	.01
						Common						
9. Configural	27.94	8	.986	.023	.082							
10. Metric	47.36	11	.974	.050	.094	10 vs. 9	19.42	3	.012	.027	.012	.00
11. Full Scalar	87.09	14	.947	.061	.118	11 vs.10	39.73	3	.027	.011	.024	.00
12. Partial Scalar	48.24	12	.974	.050	.090	12 vs.10	.88	1	.000	.000	.004	.35
Women						DC by Self						
13. Configural	190.01	110	.974	.036	.036							
14. Metric	233.59	118	.963	.048	.042	14 vs.13	43.58	8	.011	.012	.006	.00
15. Full Scalar	386.24	126	.916	.060	.061	15 vs.14	152.65	8	.047	.012	.019	.00
16. Partial Scalar	267.84	122	.953	.052	.046	16 vs.14	34.25	4	.010	.004	.004	.00
						DC by Partner						
17. Configural	216.44	110	.977	.034	.042							
18. Metric	231.76	118	.975	.039	.042	18 vs.17	15.32	8	.002	.005	.000	.05
19. Full Scalar	320.30	126	.957	.049	.053	19 vs.18	88.54	8	.018	.010	.011	.00
20. Partial Scalar	269.96	122	.967	.044	.047	20 vs.18	38.20	4	.008	.005	.005	.00
						Common						
21. Configural	21.30	8	.995	.016	.054							
22. Metric	47.12	11	.986	.040	.076	22 vs.21	25.82	3	.009	.024	.022	.00

23. Full Scalar	72.73	14	.977	.045	.085	23 vs.22	25.61	3	.009	.005	.009	.00

Note. df = degrees of freedom; CFI = comparative fit index; SRMR = Standardized Root Mean Square residual; RMSEA = Root Mean Square Error of Approximation; DC = dyadic coping; $\Delta\chi^2$ = chi-square difference test. Items (2, 3,17,18) and two evaluation items (item 36 and 37) were excluded for the analysis.

Table 6

Model Indices for Measurement Invariance across Genders for the Chinese Sample

	Goodness-of-fit Indices					Comparison of Nested Model						
Invariance Types	χ^2	*df*	CFI	SRMR	RMSEA	Contrast	$\Delta\chi^2$	Δdf	ΔCFI	ΔSRMR	ΔRMSEA	*p*
						DC by Self						
1. Configural	201.34	80	.956	.047	.053							
2. Metric	293.23	170	.950	.057	.055	2 vs. 1	91.89	90	.006	.010	.002	.55
3. Full Scalar	299.36	180	.950	.058	.055	3 vs. 2	6.13	10	.000	.001	.000	.00
						DC by Partner						
4. Configural	181.83	80	.951	.047	.050							
5. Metric	298.20	170	.946	.056	.056	5 vs. 4	116.37	90	.005	.009	.006	.90
6. Full Scalar	304.95	180	.946	.057	.049	6 vs. 5	6.75	10	.000	.001	.007	.61
						Common						
7. Configural	8.52	4	.986	.028	.065							
8. Metric	16.91	11	.986	.032	.068	8vs. 7	8.39	7	.000	.004	.003	.09
9. Full Scalar	24.15	14	.985	.036	.058	9vs. 8	7.24	3	.001	.004	.010	.55

Note. df = degrees of freedom; CFI = comparative fit index; SRMR = Standardized Root Mean Square residual; RMSEA = Root Mean Square Error of Approximation; DC = dyadic coping; $\Delta\chi^2$ = chi-square difference test. Items (2, 3,17,18) and two evaluation items (item 36 and 37) were excluded for the analysis.

Descriptive and latent mean comparisons. After establishing scalar invariance, we conducted descriptive statistics and latent mean comparisons across cultures and genders (see Table 7). Comparing latent means across cultures, we found a number of significant differences across Chinese-Swiss and Chinese-U.S. samples. In general, Westerners scored higher in *Supportive*, *Delegated*, and *Common* DC behaviors whereas Chinese scored higher in *Negative* DC. Comparing latent means between Chinese husbands and wives, we found that Chinese couples only differed in *Stress Communication* behaviors: husbands scored higher in *Stress Communication* by *Self* whereas wives rated higher in *Stress Communication* by *Partner*.

Reliability. The reliability of test scores is shown in Table 7 and results revealed that the reliability of most test scores were good or acceptable; however, two of them were poor (α = .51 for husbands' *Problem-focused Supportive* DC by *Self* and α = .52 for wives' *Delegated* DC by *Partner*). Notably, lower reliability of test scores can be accounted for subscales consisted of two items (de Vaus, 2002). In line with current suggestions (e.g., George & Mallery, 2003; Nunnally & Bernstein, 1994), the reliability of test scores between .50 and .60 is poor but still acceptable.

Aim 3: Testing Construct Validity

Table 8 displays three MTMM correlation matrices. In all three matrices, convergent validity coefficients (monotrait-heteromethod) were significant and higher than the minimum value of r = .25. Overall, we found moderate convergent correlation coefficients for husbands' behaviors ($r_{average}$ = .32, range:.27 to .36), for wives' behaviors ($r_{average}$ = .32, range:.26 to .37), and for the two dimensions of *Common* DC behaviors ($r_{emotion\text{-}focused}$ = .38, $r_{problem\text{-}focused}$ = .38). These findings provide evidence for convergent validity of the DCI test scores. Examination of discriminant validity of DCI test scores showed that convergent validity coefficients (monotrait-heteromethod) were significantly larger than discriminant

validity coefficients (heterotrait-heteromethod) in 75 out of 84 comparisons, indicating that each trait comprises a unique variance. Of note, non-significant results were found in 4 comparisons for husband' behaviors (e.g., coefficient comparisons between *Emotion-focused Supportive* DC by *Self* and *Stress Communication* by *Partner*) and 5 comparisons for wives' behaviors (e.g., coefficient comparisons between *Delegated* DC by *Self* and *Problem-focused Supportive* DC by *Partner*). Overall, these results supported discriminant validity of the DCI test scores. Finally, we tested for method variance and found that heterotrait-monomethod coefficients were significantly larger than heterotrait-heteromethod coefficients in 24 of 42 comparisons, which indicates a rater's evaluation bias. Results of all the correlation comparisons are not presented here but are available upon request from the authors.

Discussion

The DCI is a widely used self-report measure to assess couples' stress and coping behaviors (see Falconier et al., 2015); however, the DCI had not been validated for use in non-Western cultures. The goal of the present study was to validate a Chinese version of the DCI by establishing the best-fitting factorial structure and MI as well as examining construct validity of test scores.

The Best-Fitting Factorial Structure

Our first aim was to test competing CFA models in order to find the best-fitting factorial structure. Prior DCI validation studies tested either a 5-factor and 2-factor solution (e.g., Randall et al., 2015) or a 4-factor and 1-factor solution (e.g., Ledermann et al., 2010), but no study had compared both solutions. Comparing the two solutions allows us to decide which one is more appropriate for use in empirical studies. Therefore, we tested and compared both solutions within three cultural groups using all 35 items. Our results of comparing these two solutions supported

Table 7

Descriptive Statistics and Reliability for the Chinese Sample and Group Mean Differences across All Three Samples

	Manifest Variables				Comparing Latent Mean Difference (PE)							
	Chinese Sample				Across Genders		Across Cultures					
	H		W		H	W	H			W		
DCI Subscales	*M (SD)*	α	*M (SD)*	α	Chinese		Chinese	Swiss	U.S.	Chinese	Swiss	U.S.
Self												
Stress Communication	3.43 (.71)	.70	3.21 (.63)	.78	.000	**.163**	.000	**.181**	**.629**	.000	**.503**	**.531**
Emotion-focused Supportive DC	3.46 (.72)	.69	3.53 (.69)	.67	.000	-.017	.000	**.336**	**.514**	.000	**.341**	**.571**
Problem-focused Supportive DC	3.40 (.75)	.51	3.55 (.68)	.60	.000	-.102	.000	**.190**	**.211**	.000	**.093**	**.272**
Delegated DC	3.40 (.71)	.60	3.50 (.70)	.60	.000	-.028	.000	.068	.101	.000	**.169**	**.156**
Negative DC	2.40 (.87)	.79	2.40 (.85)	.80	.000	-.137	.000	**-.785**	**-.700**	.000	**-.186**	**-.639**
Partner												
Stress Communication	3.21 (.70)	.73	3.38 (.65)	.75	.000	**-.176**	.000	**.286**	**-.230**	.000	**.364**	**.198**
Emotion-focused Supportive DC	3.34 (.78)	.70	3.40 (.73)	.72	.000	-.106	.000	**.560**	**.433**	.000	**.394**	**.454**
Problem-focused Supportive DC	3.42 (.78)	.63	3.34 (.77)	.62	.000	.029	.000	**.136**	.073	.000	**.226**	**.130**
Delegated DC	3.32 (.80)	.66	3.31 (.83)	.52	.000	-.072	.000	-.011	**.216**	.000	**.187**	**.176**
Negative DC	2.46 (.68)	.79	2.42 (.82)	.75	.000	-.085	.000	**-.772**	**-.341**	.000	**-.086**	**-.197**
Common												
Emotion-focused Common DC	3.62 (.68)	.80	3.61 (.72)	.76	.000	.030	.000	**.622**	**.172**	.000	.109	.237
Problem-focused Common DC	3.20 (.90)	.60	3.30 (.82)	.66	.000	-.126	.000	**-.584**	**-.568**	.000	**.263**	**.052**

Note. All results are based on the final scalar invariance model. Items (2, 3,17,18) and two evaluation items (36 and 37) were excluded for the analysis. In comparison with gender differences, we chose Chinese men as the reference group and a significant difference is indicated in bold ($p < .05$; two-tailed) for women. For comparisons across cultures, we chose the Chinese sample (husbands and wives respectively) as the reference group and if we found a difference within samples from Switzerland or the U.S., the significant estimate is indicated in bold ($p < .05$; two-tailed). DC = dyadic coping; α = Cronbach's alpha; PE = parameter estimates of factor means; M = mean; SD = standard deviation; H = husbands; W = wives.

Table 8
Three Multitrait-Multimethod Matrices for Husbands' behaviors, Wives' behaviors, and Common DC Behaviors

	Husbands' behaviors								
	Husbands' Self-report					Wives' Partner-report			
	SC	EDC	PDC	DDC	NDC	SC	EDC	PDC	DDC
Husbands' Self-report									
SC									
EDC	.31								
PDC	.22	.52							
DDC	.25	.45	.52						
NDC	-.02	-.22	-.13	-.18					
Wives' Partner-report									
SC	**.36**	.17	.12	.18	-.02				
EDC	.21	**.29**	.16	.15	-.08	.43			
PDC	.22	.20	**.35**	.20	-.04	.42	.51		
DDC	.20	.20	.20	**.27**	-.12	.27	.35	.47	
NDC	-.03	-.13	-.07	-.08	**.35**	-.14	-.21	-.09	-.10

	Wives' behaviors								
	Wives' Self-report					Husbands' Partner-report			
	SC	EDC	PDC	DDC	NDC	SC	EDC	PDC	DDC
Wives' Self-report									
SC									
EDC	.43								
PDC	.39	.60							
DDC	.39	.43	.47						
NDC	-.02	-.25	-.13	-.06					
Husbands' Partner-report									
SC	**.37**	.29	.20	.15	-.14				
EDC	.21	**.34**	.20	.15	-.08	.49			
PDC	.21	.17	**.26**	.12	-.04	.37	.59		
DDC	.16	.12	.14	**.28**	.10	.37	.46	.52	
NDC	-.07	-.08	-.01	.00	**.36**	-.08	-.21	-.13	-.18

	Common DC Behaviors			
	Husbands		Wives	
	(1)	(2)	(3)	(4)
Husbands				
Emotion-focused CDC (1)				
Problem-focused CDC (2)	.45			
Wives				
Emotion-focused CDC (3)	**.37**	.17		
Problem-focused CDC (4)	.24	**.38**	.46	

Note. The convergent validity diagonals (monotrait-heteromethod coefficients) are indicated in bold; all correlation coefficients are significant ($p < .05$; two-tailed). SC = stress communication; EDC = emotion-focused supportive dyadic coping; PDC = problem-focused supportive dyadic coping; DDC = delegated dyadic coping; NDC = negative dyadic coping; DC = dyadic coping; CDC = common dyadic coping.

for all theoretically formulated factors of the DCI.

Measurement Invariance and Latent Mean Comparisons

The second aim was to use the best-fitting model to test whether MI could be established across three cultural groups (Chinese, Swiss, and the U.S.) and across genders. Findings of the multi-group CFA analyses demonstrate full configural, metric invariance, and full/partial scalar invariance. First, the establishment of full configural invariance indicates that same items are associated with the same latent factors across cultures. Second, results suggest that factor loadings for all items are consistent across Western and Eastern populations. In relation to scalar invariance, we only found partial MI. Cultural factors, such as collectivistic values, can affect the intercept of items (Chen, 2007; Schwarz et al., 2014), which could suggest that couples who live in collectivistic cultures may conceptualize their behaviors differently compared to couples who live in individualistic cultures. In addition, findings of MI across genders supported full configural, metric, and scalar invariance, indicating that factorial structure, factor loadings, and item intercepts are invariant between Chinese husbands and wives. These findings confirm other DCI validation studies that have examined MI across genders (Randall, et al., 2015; Vedes et al., 2013). This indicates that the Chinese version of DCI can be used to compare mean differences between Chinese husbands and wives.

In the subsequent steps, we compared latent group means between samples and found several mean differences between cultural groups. Chinese couples scored lower in DC behaviors such as *Emotion-* and *Problem-focused Supportive* DC, *Delegated* DC, and *Common* DC, and higher in *Negative* DC than Swiss and U.S. couples. Surprisingly, Chinese couples reported using less positive but more negative coping behaviors. These differences may be due to cultural perceptions of how one should behave within the romantic relationship (e.g., different perceptions of intimacy; Marshall, 2008) or the cultural heterogeneity within

one cultural group (Quek, Knudson-Martin, Rue, & Alabiso, 2010). For example, Chinese couples and Western couples are supposed to perceive negative or positive DC behaviors asymmetrically due to culturally different expectations (Ebrey, 2006; Osyerman et al., 2002). However, lacking other relationship variables in the current study may remind us to interpret these results with caution.

According to gender differences within Chinese couples, we found that couples exhibited differences in *Stress Communication* behaviors; otherwise, they reported the same amount of DC behaviors. This indicates that both husbands and wives can support each other on a regular basis, which in general might reflect the modern egalitarian relationship mode (Shek, 2006; Quek et al., 2010). Therefore, it is possible that Chinese couples may have shifted to share equal roles in tackling familial affairs (e.g., household chores, jobs, parenting; see Wang et al., 2010), which in turn seems to equalize their levels of stress expression and support provision.

Furthermore, we found acceptable to good reliability of the DCI test scores for most subscales with the exception of two subscales where the reliability of test scores was poor (men's *Problem-focused Supportive* DC ($\alpha = .51$) by *Self* and women's *Delegated DC* by *Partner* ($\alpha = .52$). As these two subscales are composed of just two items, results are still plausible (de Vaus, 2002). Future research might focus on exploring the reliability of test scores of these two subscales with different samples.

Construct Validity

This is the first DCI validation study to use a MTMM approach to test for convergent validity, discriminant validity, and method variance. Testing for *convergent validity*, we found that all convergent validity coefficients (monotrait-heteromethod) were significant and above the minimal criteria ($r = .25$), confirming convergent validity of the DCI test scores. Nevertheless, convergent validity coefficients were all in a lower to medium range. Such

lower correlations can be explained by the way items were constructed (Bodenmann, 2008). The DCI items assess the frequency of coping behaviors over an unspecific time span, which means that participants have to estimate their own and their partners' coping behaviors across situations (and time). Therefore, it is not reasonable to expect high correlations across raters.

According to *discriminant validity* of test scores, we found that convergent validity coefficients (monotrait-heteromethod) were significantly larger than discriminant validity coefficients (heterotrait-heteromethod) in 75 out of 84 comparisons. This establishes discriminant validity of the DCI test scores as it suggests that each trait assesses a unique and discriminant aspect of dyadic coping. Finally, we tested for method variance (i.e., if variability between traits can only be explained by the traits or also based on differences). We found that same-rater coefficients (heterotrait-monomethod) were significant larger than cross-rater coefficients (heterotrait-heteromethod) in 24 out of 42 comparisons, indicating a rater' evaluation bias. However, such evaluation biases are common for many scales (e.g., Anusic et al. 2009; Zuo et al., 2013). Altogether, the construct validity of DCI test scores are supported.

Limitations

Limitations of the current study must be addressed, despite its strengths. First, the use of a convenience sample may limit the generalizability of findings to all Chinese couples (and non-Western couples). Utilizing a random stratified sampling technique based on socioeconomic factors (i.e., age, income, and education) would be more beneficial for improving the applicability of the DCI. Second, although couples were mailed the questionnaires packets and were instructed to complete the measures independently, we cannot fully rule out the possibility that one partner completed both sets of questionnaires. Although data from couples with identical answers was excluded in our analyses, future research should utilize methodologies that allow us to control for independent reports (e.g.,

make use of online assessment tool through giving couples separate account). Third, three samples used to test for MI differed in age and education. Although it could have been advantageous to match couples based on age, income, education, one must also consider that income and education may simply be distinct among the three countries. Fourth, as the study was based on cross-sectional data and test-retest reliability could not be computed. Fifth, two subscales with two items each showed lower reliability of test scores. Future research should further examine reliability of test scores for these two subscales. Finally, we found a rater' evaluation bias, which cannot be overcome using a self-report measure. Alternatively, observational behavioral technique (Raush, Barry, Hertl, & Swain, 1974) could be used to replicate findings of the DCI scale.

Theoretical and Practical Implications

This study has a number of important theoretical and practical implications for future research. First, the established factorial structure supports the theoretical conceptualization of DC behaviors beyond Western cultures (Bodenmann, 2005). Second, the validation of the Chinese version of the DCI may open the door for clinicians and researchers to use the measure to examine stress-coping processes in a collectivistic culture. Third, the Chinese version of DCI can be used to examine such stress-coping processes in Chinese couples, which could provide a new insight for clinicians who provide therapy and counseling for Chinese couples.

Conclusion

The Dyadic Coping Inventory (Bodenmann, 2008) is a useful measure for relationship researchers and mental health professionals who work with couples trying to manage stress in their relationships. The current study demonstrates that the Chinese version of the DCI is a valid and reliable instrument, which can be used to examine stress and coping behaviors in Chinese couples. Moreover, this measure is a valuable tool for conducting cross-cultural

research between Western and Eastern cultures, which can further inspire additional research on how stress may affect couples' coping behaviors in cross-cultural contexts.

8 Study 2 Dyadic Coping in Chinese Couples[8]

Introduction

China is the world's most populous country, with over 1.3 billion people (National Bureau of Statistics of China, 2013). Chinese have traditionally maintained strong family support networks (Shek, 2006). However, rapid economic development has eroded the traditional practice of extended family co-residence, with a large number of young Chinese migrating from rural areas to cities and from China to other countries (Chen, Hao, & Stephens, 2010; Ji, Xu, & Rich, 2002; Yang, 2013). In conjunction with this reduction in family support, Chinese couples are under increasing stress due to the soaring costs of urban accommodation in China (Chen et al., 2010), conflict between Western influences and traditional values (see e.g., Quek, Knudson-Marin, Rue, & Alabiso, 2010), and intergenerational stress resulting from the one child policy (Hesketh, Lu, & Xing, 2005). This means that Chinese couples have increased need for support at a time when partners are increasingly reliant on each other for support. Consequently, dyadic coping has emerged as an important issue for Chinese couples. The purpose of this chapter is to provide a reference for scholars and clinicians who wish to understand the use and appropriateness of dyadic coping for Chinese couples and do further research and practice in this area. We begin with a discussion of Chinese cultural characteristics of couple relationships and the stressors and resources available to these couples. This is followed by a presentation of the existing research on Chinese couples' dyadic coping with stress, including applications of the Systemic Transactional Model (STM; Bodenmann, 2005) to Chinese couples. Finally, implications for practice and research are discussed.

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[8] This study was published in a book volume.
Xu, F., & Hiew, D. N. (2016). Dyadic coping in Chinese couples. In M. K. Falconier, A. K. Randall, & G. Bodenmann (Eds.), *Couples coping with stress: A cross-cultural perspective* (pp. 218–235). New York, NY: Routledge.

Review of the Literature

Couples' Relationships in China

Cultural influences. To understand couples' relationships in China, it is necessary to understand the values of Confucianism and collectivism. Ethical and moral rules developed by the Chinese philosopher Confucius have influenced Chinese behavior for over 2000 years (Huang & Grove, 2012). A central tenet of Confucian teachings was *Xian Dao* (filial piety) – the feelings of love and obligation children should have for their parents (Ebrey, 2006). Marriage was viewed as a filial duty, and failure to produce heirs was considered the worst of unfilial acts (Ebrey, 2006). Spouses resided with the husband's family and were expected to invest their energy in caring for their elders and children, rather than the couple's relationship (Shi & Wang, 2009). There is evidence that filial piety continues to be valued in Chinese cultures today. For example, in marital decision-making, Chinese place greater weight than Americans on a prospective partner's fulfillment of filial duties, and are more likely to comply with network members' wishes (Zhang & Kline, 2009).

Confucian doctrines promoted a patriarchal family system in which females obeyed their fathers, husbands and sons, and focused on domestic duties, while males provided for the family financially and glorified the family name with achievements (Huang & Grove, 2012; Lin & Ho, 2009). Although the Communist regime promoted gender equality and participation of women in the workforce (Zuo, 2003), there is evidence that traditional gender roles persist. For example, interviews with husbands and wives in Beijing revealed that the majority perceived greater domestic contributions from the wife and greater financial responsibility for the husband to be fair (Zuo & Bian, 2001).

China has been identified as a highly collectivistic culture (see Osyerman, Coon, & Kemmelmeier, 2002). Collectivistic cultures value the ability to work harmoniously within a network of interdependent relationships and fulfill one's role and obligations more highly

than individual goal achievement (Markus & Kitayama, 1991; see Chapter 2). These values influence communication behavior between partners and family members. In contrast to the direct, explicit statements of thoughts and feelings that are considered good communication in Western countries, Chinese consider good communication to be *Han Xu* (contained, reserved, implicit and indirect; Gao & Ting-Toomey, 1998). Chinese are socialized to suppress their emotions and express ideas hesitantly, in order to be able to negotiate meaning with their conversational partner and retreat if necessary to preserve relationship harmony (Gao & Ting-Toomey, 1998).

Chinese collectivistic views also shape different couple relationship standards. Couple relationship standards have been defined as beliefs about what partners and relationships should be like (Baucom, Epstein, Rankin, & Burnett, 1996). Chinese couples have been found to place greater importance than Western couples on relations with the extended family, relational harmony, face maintenance, and traditional gender roles; whereas Western couples have been found to place greater importance than Chinese couples on intimacy and the demonstration of love and caring within couple relationships (Hiew, Halford, van de Vijver, & Liu, 2015). These differences may influence the provision of spousal support during times of stress. Research indicates that Chinese receive more informational and problem-solving support from their spouses than Americans, and Americans receive greater emotional support from their spouses than Chinese (Xu & Burleson, 2001). Compared with Americans, Chinese have reported regarding escaping and dismissing negative feelings and messages low in person-centeredness as more appropriate support strategies (Barbee & Cunningham, 1995). These findings have been attributed to a collectivistic cultural focus on avoidance of emotionality, recovery of composure and restoration of social harmony (Burleson, 2003). In summary, the values of Confucianism and collectivism have fostered prioritization of the family over the couple, traditional gender roles, and an emphasis on suppression of individual

thoughts and emotions in Chinese cultures in order to preserve relationship harmony. These cultural influences are likely to have suppressed the use of dyadic coping by Chinese couples, particularly emotion-focused dyadic coping methods.

Stressors and Resources. Chinese couples are facing high levels of economic, environmental, and social stress. Rapid economic development over the last two decades has greatly improved Chinese living standards and quality of life (Shu & Zhu, 2009). However, this economic development has been accompanied by mass migration of rural people into the cities (Yang, 2013), with the result that urban housing has become difficult to obtain and extremely expensive (e.g., Chen et al., 2010). Family members frequently reside in separate cities in order to pursue economic advancement (Abbott & Meredith, 1994). Dangerous levels of air pollution have led to restriction of car ownership and usage in some cities (see Gan, 2003). A focus on quality improvement in state-owned enterprises has led to the practice of job shifting (transferring jobs to more highly skilled and younger workers and privatization of asset). Consequently, many urban Chinese couples are experiencing the disappointment of unrealized goals. The extent to which couples can engage in positive dyadic coping, rather than express their disappointment through recriminations towards each other or withdraw into self-focused coping strategies, may be important for relationship satisfaction and well-being.

The opening of Chinese domestic markets to Western investors in 1978 resulted in the introduction of Western values and ideas (Shek, 2006). Large numbers of young people have been inspired to pursue individualistic goals such as pursuit of personal desires and interests (Shek, 2006). For example, increasing numbers of Chinese couples are engaging in non-traditional forms of marriage, such as marriage without children, naked marriages (getting married without any fixed assets) and flash marriages (engagement when the partners have known each other for less than 3 months. Extra-marital affairs are increasing (Zhang & Beck, 1999) and China’s divorce rate has steadily risen over the past decade and now surpasses the

marriage rate (Ministry of Civil Affairs of PRC., 2013). Dual-career couples are now the majority in urban areas, with the result that the division of household labor is gradually becoming more egalitarian (Zhang et al., 2013). Despite these developments, there is evidence that collectivistic and Confucian values such as relationship harmony, filial piety and fulfillment of traditional gender roles still remain important to Chinese couples (Quek et al., 2010, Zhang & Kline, 2009; Zuo & Bian, 2001). Therefore, couples can experience a push-and-pull conflict between Chinese and Western influences (see e.g. Quek et al., 2010). This could place the couple relationship under great stress, particularly if partners are unable to work together to resolve this conflict in a mutually satisfactory way, or there is family pressure to adhere to traditional ways.

In 1978, the Chinese government launched a population control policy of restricting urban couples to only one child. This molded the majority of families into a "4-2-1" structure (four grandparents, two parents, one child; Hesketh et al., 2005). This demographic shift has produced severe intergenerational stress for young urban Chinese couples, who must bear the responsibilities of caring for their child and four parents without sibling assistance (Hesketh et al., 2005). In addition, the hopes and expectations of two families are placed on one child, resulting in pressure for the child to succeed, over-indulgence of the child, and a child-focused life for the couple (Epstein et al., 2014).

In summary, in recent years China has undergone enormous social, environmental and economic change, particularly in urban areas. These changes have resulted in young, urban Chinese couples facing the stressors of reduced family support; greater parental expectations; conflict between Chinese and Western cultural influences; difficulty in obtaining housing, transport and employment; and a large discrepancy between aspirations and achievements.

Couples' Coping with Stress

The large number of stressors faced by modern Chinese couples (described above) have led to research interest in Chinese couples' coping. This research has generally focused on the relationship outcomes of particular types of stressors, and individual coping processes, rather than dyadic coping processes. For example, economic stress (Lam, 2011) and work-family conflict (Zhang et al., 2013) have been found to be negatively associated with Chinese couples' relationship satisfaction. Chinese couples with lower quality marital and parent-child relationships report poorer physical and psychological health (Shek, 1996). Post-natal depression is more common in mainland Chinese couples with one depressed partner, lower social support, and higher perceived stress (Gao, Chan, & Mao, 2009). Decreased relationship satisfaction has been noted as occurring in Chinese couples after life crises (unanticipated situations that require change in family life), but not after life transitions (normative developmental changes in the family or family members; Chi et al., 2011). Greater perceived control (for female partners) and greater availability of social support have been found to buffer the adverse effect of life crises on Chinese couples' relationship satisfaction. Despite these demonstrations of adverse effects of stress on Chinese couple functioning, a culturally specific positive effect of stress on Chinese couples has been identified. Chinese husbands' sacrifices for the family and financial contributions appear to elicit higher levels of *enqing* – feelings of admiration and gratitude towards one's spouse – in their wives when the family has been under higher levels of stress (Chen & Li, 2007).

The research described above did not examine dyadic coping processes. However, using the STM, we can speculate that in a culture in which financially supporting the family is considered a male responsibility (Zhang & Kline, 2009), economic stress may be appraised by some spouses as a personal failure of the husband. This may lead to use of negative dyadic coping strategies such as criticism by the wife and withdrawal by the husband, and relationship deterioration. Conflict between the demands of work and family life may

similarly provoke relationship-deteriorating coping behavior due to traditional gender roles. Wives' careers may not be considered important for the family, and therefore, wives struggling to balance work with family duties may not receive supportive and delegated dyadic coping from their husbands. If this occurs, wives are likely to negatively appraise their husband's appraisals of the situation and a vicious cycle of negative coping behavior and relationship deterioration may ensue. When husbands experience stress about work-family balance, a desire to uphold Confucian values may lead the couple to set unrealistic goals such as freeing the husband to focus only on his career, resulting in excessive amounts of delegated dyadic coping by the wife and increasing strain on the couple relationship.

The previously described research finding that the stress of low quality family relationships leads to poorer physical and psychological health can also be understood from a STM perspective. In a collectivistic culture where the ability to maintain harmonious relationships is prized above individual achievements (Markus & Kitayama, 1991), relationship problems seem likely to be appraised particularly negatively. When the couple relationship is problematic, negative dyadic coping seems likely to occur and exacerbate the situation. Similarly, when one partner is depressed, negative appraisals and negative dyadic coping are more likely to occur during the stressful early days of child-rearing, triggering post-natal depression in the other partner. Of note, the identification (in the research reported above) of a negative effect of lack of wider social support for the couple suggests that addition of the relationship network of the couple to the STM may be useful for understanding the effects of stress in collectivistic cultures. The utility of inclusion of the relationship network is supported by the finding (reported above) that greater social support buffers the adverse effect of life crises on Chinese couples' relationship satisfaction.

As reported above, the stress of unanticipated life crises has been found to have negative effects on Chinese couples, but the stress of normative developmental changes in the

family has not. A possible explanation from a STM perspective is that Chinese couples may appraise normative changes positively, as part of the collective experience of family life. The normative nature of such stressors may also make goal-setting and dyadic coping easier for the couple due to the presence of cultural scripts for coping positively with such situations. The positive effect of high levels of stress on *enqing* also supports the importance of appraisals of stressors.

The above consideration of existing research from the perspective of the STM suggests that this model could provide insight into the associations between stressors and Chinese couple relationship outcomes. However, this model has not been explicitly tested with Chinese couples. Therefore, we conducted the first study on dyadic coping by Chinese couples and examined the associations between dyadic coping and relationship satisfaction.

Results

Application of the STM to Chinese couples.

Participants in the current study were 474 couples (N = 948 individuals) recruited in urban (Beijing and Guangzhou) and rural areas of China (e.g., some counties of Guangdong and Jiangxi provinces). Husbands' average age was 36.5 years (SD = 7.7), while wives' average age was 34.4 years (SD = 7.3). Couples had an average of one child (SD = 0.66, range = 0 to 3), and the average relationship duration was 9.4 years (SD = 7.9). Couples were mailed two copies of the Chinese translations of the Relationship Assessment Scale (RAS; Hendrick, S., Dicke, & Hendrick, C., 1998) and the Dyadic Coping Inventory (DCI; Bodenmann, 2008). The Chinese translation of the DCI has been validated by Xu and colleagues (Xu, Hilpert, Randall, Li, & Bodenmann, 2016), who demonstrated measurement invariance across genders and Chinese, Swiss, and U. S. samples; convergent (with relationship satisfaction) and divergent (from individual coping) validity; and good reliability

of sub-scale and total scores. Partners were instructed that they should complete their measures alone and mail them back separately from their partner's measures.

Dyadic coping in younger vs. older couples. Participants were separated into older (over 35 years) and younger (less than 35 years) age groups. *T*-tests were used to compare the DCI scores of older and younger husbands and older and younger wives (see Table 9). Notably, there was no significant difference between older and younger husbands' scores on any dyadic coping behavior. However, in comparison with younger wives, older wives reported lower levels of stress communication by self, problem-focused supportive dyadic coping by their partner, problem-focused common dyadic coping, total common dyadic coping and total dyadic coping, and higher levels of delegated dyadic coping by self. As discussed earlier in this chapter, traditional Chinese values emphasize suppression of thoughts and emotions in order to preserve relationship harmony. These values are likely to be held most strongly by older wives, whose ways of behaving in their relationships were established before China's doors opened to Western influences. Therefore, older wives may engage in less talk during stressful times and instead, demonstrate their support in practical ways such as by taking on their partner's tasks. They may not expect their husband to support them emotionally by talking through problems and their

Table 9
Age Differences in Dyadic Coping Behaviors

Age differences for husbands	Older		Younger		*t-test*	
DCI scales	*M*	*SD*	*M*	*SD*	*p*	*d*
Oneself						
Stress communication	3.27	.68	3.19	.66	.19	.06
Emotion-focused SDC	3.53	.72	3.60	.77	.34	.04
Problem-focused SDC	3.57	.67	3.54	.69	.71	.01
Delegated DC	3.51	.66	3.50	.72	.90	.00
Negative DC	2.41	.80	2.40	.89	.93	.00
Partner						
Stress communication	3.37	.65	3.41	.70	.48	.03
Emotion-focused SDC	3.40	.78	3.44	.82	.64	.02
Problem-focused SDC	3.37	.73	3.31	.81	.38	.04
Delegated DC	3.38	.81	3.27	.85	.15	.07

Negative DC	2.42	.76	2.41	.87	.84	.01
Common						
Emotion-focused CDC	3.57	.71	3.63	.72	.36	.04
Problem-focused CDC	3.24	.83	3.34	.82	.17	.06
Total DC	3.19	.36	3.19	.39	.19	.06
Age differences for wives						
Oneself						
Stress communication	3.29	.78	3.51	.71	**.00**	.14
Emotion-focused SDC	3.47	.73	3.51	.78	.57	.03
Problem-focused SDC	3.36	.74	3.41	.76	.51	.03
Delegated DC	3.52	.69	3.34	.71	**.01**	.12
Negative DC	2.33	.80	2.42	.90	.31	.05
Partner						
Stress communication	3.17	.78	3.24	.70	.36	.04
Emotion-focused SDC	3.25	.87	3.37	.83	.14	.07
Problem-focused SDC	3.29	.81	3.48	.77	**.01**	.12
Delegated DC	3.24	.81	3.35	.79	.14	.07
Negative DC	2.47	.78	2.46	.85	.87	.01
Common						
Emotion-focused CDC	3.56	.75	3.65	.65	.18	.06
Problem-focused CDC	3.01	.91	3.29	.88	**.00**	.15
Total DC	3.10	.41	3.19	.39	**.02**	.11

Notes. DC = dyadic coping, SDC = supportive dyadic coping, CDC = common dyadic coping. Bold numbers are significant at $p < .001$. Couples rated dyadic coping behaviors on a 5-point Likert scale (1 = *not at all/very rarely* to 5 = *very often*). There were different numbers of participants in each group: Older husbands $n = 198$, younger husbands $n = 276$, older wives $n = 150$, younger wives $n = 324$.

husbands may be less likely to do so, due to the more traditional values of their generation. The absence of age differences amongst husbands may be due to lack of generational change in males' values regarding the spousal relationship, possibly due to the greater gains for husbands of adherence to traditional gender roles, or reluctance by younger husbands to report engagement in dyadic coping behaviors that are not part of the traditional masculine role in China. Given the lower relationship satisfaction amongst these Chinese couples ($M = 3.54$) compared with Western samples (e.g. $M = 4.46$ for U.S. samples, Xu et al., manuscript under review), it may be that Chinese husbands and wives across the lifespan could benefit from higher levels of dyadic coping.

Dyadic coping in urban v. rural couples. There are large differences in living standards and sources of stress between urban and rural areas in China that may be associated

with differences in coping behaviors (Hesketh et al., 2005). Therefore, the dyadic coping behaviors of couples residing in major cities, other urban areas and rural areas were compared. There were significant regional differences in dyadic coping for both husbands and wives (see Table 10). Compared with husbands in urban areas, husbands in rural areas reported lower emotion-focused and problem-focused supportive dyadic coping by self, stress communication by partner, emotion-focused and problem-focused supportive dyadic coping by partner, negative dyadic coping by partner, problem-focused common dyadic coping, total common dyadic coping, and total overall dyadic coping. Wives in rural areas reported lower levels of problem-focused supportive dyadic coping by self and higher levels of negative dyadic coping by self than urban wives. These results may be explained by the higher levels of education and exposure to Western ideas and ways of living amongst urban Chinese. Traditional values regarding communication and gender roles are likely to be stronger amongst rural Chinese and may inhibit their ability to

Table 10
Regional Differences in Dyadic Coping Behaviors

Regional differences for husbands	Urban areas		Rural areas		*t-test*	
DCI scales	*M*	*SD*	*M*	*SD*	*p*	*d*
Oneself						
Stress communication	3.25	.65	3.13	.73	.14	.07
Emotion-focused SDC	3.61	.72	3.39	.82	**.01**	.12
Problem-focused SDC	3.59	.69	3.38	.66	**.01**	.12
Delegated DC	3.52	.70	3.44	.68	.31	.05
Negative DC	2.39	.88	2.45	.75	.58	.03
Partner						
Stress communication	3.44	.66	3.19	.71	**.00**	.14
Emotion-focused SDC	3.46	.79	3.26	.81	**.04**	.10
Problem-focused SDC	3.38	.77	3.13	.76	**.01**	.13
Delegated DC	3.33	.86	3.23	.72	.28	.05
Negative DC	2.38	.83	2.59	.79	**.03**	.09
Common						
Emotion-focused CDC	3.63	.71	3.51	.72	.15	.07
Problem-focused CDC	3.34	.81	3.13	.88	**.03**	.10
Total DC	3.21	.37	3.11	.42	**.03**	.10
Regional differences for wives						

Oneself						
Stress communication	3.46	.74	3.36	.73	.24	.05
Emotion-focused SDC	3.50	.77	3.47	.71	.68	.02
Problem-focused SDC	3.42	.75	3.30	.76	.18	.06
Delegated DC	3.41	.70	3.32	.72	.27	.05
Negative DC	2.37	.87	2.47	.88	.35	.04
Partner						
Stress communication	3.23	.72	3.15	.75	.32	.05
Emotion-focused SDC	3.33	.85	3.34	.83	.87	.00
Problem-focused SDC	3.43	.80	3.38	.70	.60	.02
Delegated DC	3.31	.78	3.33	.88	.84	.01
Negative DC	2.44	.83	2.53	.82	.41	.03
Common						
Emotion-focused CDC	3.62	.69	3.62	.65	.98	.00
Problem-focused CDC	3.20	.89	3.20	.94	.98	.00
Total DC	3.17	.39	3.15	.42	.77	.01

Notes. DC = dyadic coping, SDC = supportive dyadic coping, CDC = common dyadic coping. Bold numbers are significant at $p < .001$. Couples rated dyadic coping behaviors on a 5-point Likert scale (1 = *not at all/very rarely* to 5 = *very often*). There were different numbers of participants in each group: Urban husbands $n = 386$, rural husbands $n = 88$, urban wives $n = 386$, rural wives $n = 88$.

engage in many of the dyadic coping behaviors. Rural wives' higher levels of negative dyadic coping may also be due to greater endorsement of traditional values. As noted earlier in this chapter, the provision of support in collectivistic cultures is aimed at restoration of social composure. Therefore, rural wives may criticize their husbands' coping in an attempt to motivate them to compose themselves and behave in the culturally approved manner.

Dyadic coping according to income level. Although the income of Chinese citizens has improved greatly, the average Chinese cannot afford to buy a house, which is considered an important step towards starting a family, or a car or other highly priced consumer products (Chen et al., 2010). The financial stress is likely to be greater for Chinese couples with lower incomes, and therefore they may require higher levels of dyadic coping skills. To investigate this, three groups were compared: A high monthly income group (income above or equal to RMB10001, which is approximately US$1600), a medium monthly income group (above RMB2001 or approximately US$335), and a low monthly income group (below RMB2001 or approximately US$335). Results are presented in Table 11. Wives' reported dyadic coping did not differ between income groups. However, post hoc tests revealed that there were

significant differences in use of problem-focused supportive dyadic coping by self (lower for high income) and delegated dyadic coping by self (lower for high income) between husbands of different income levels. This indicates that husbands with higher incomes were less likely than husbands with lower incomes to take on tasks to help their partner or support their partner by helping her to see the problem in a different light. It may be that husbands with higher incomes feel that they are fulfilling their culturally-prescribed duties to the family, and therefore do not need to provide other forms of support to their wives. Alternatively, it may be that husbands with lower incomes

Table 11
Differences in Dyadic Coping Behaviors According to Income Level

Differences for husbands	High		Medium		Low		*ANOVA*	
	M	*SD*	*M*	*SD*	*M*	*SD*	*p*	$\acute{\omega}^2$
DCI scales								
Oneself								
Stress communication	3.39	.69	3.45	.77	3.46	.60	.78	-.00
Emotion-focused SDC	3.47	.73	3.50	.79	3.51	.58	.92	-.00
Problem-focused SDC	3.21	.70	3.45	.67	3.30	.81	**.01**	.01
Delegated DC	3.22	.76	3.45	.67	3.30	.79	**.01**	.01
Negative DC	2.46	.89	2.38	.88	2.34	.76	.68	-.00
Partner								
Stress communication	3.14	.67	3.24	.76	3.17	.61	.48	-00
Emotion-focused SDC	3.28	.79	3.34	.87	3.38	.76	.81	-.00
Problem-focused SDC	3.47	.70	3.43	.80	3.26	.79	.34	.00
Delegated DC	3.41	.75	3.30	.83	3.21	.67	.33	.00
Negative DC	2.47	.87	2.44	.82	2.59	.81	.57	-.00
Common								
Emotion-focused CDC	3.61	.65	3.63	.69	3.55	.74	.80	-.00
Problem-focused CDC	3.12	.98	3.24	.86	3.04	.94	.25	.00
Total DC	3.14	.40	3.18	.40	3.12	.31	.56	.00
Differences for wives								
Oneself								
Stress communication	3.25	.57	3.24	.68	3.45	.38	.72	-.00
Emotion-focused SDC	3.40	.69	3.58	.73	3.17	.66	.24	.00
Problem-focused SDC	3.41	.60	3.55	.69	3.62	.70	.25	.00
Delegated DC	3.42	.67	3.52	.69	3.47	.75	.57	-.00
Negative DC	2.53	.73	2.40	.85	2.35	.92	.53	-.00
Partner								
Stress communication	3.32	.57	3.39	.68	3.44	.75	.63	-.00
Emotion-focused SDC	3.37	.72	3.44	.79	3.37	.88	.69	-.00
Problem-focused SDC	3.34	.75	3.34	.78	3.30	.79	.91	-.00
Delegated DC	3.30	.77	3.35	.82	3.16	.92	.18	.00

Negative DC	2.49	.73	2.43	.83	2.35	.84	.61	-.00
Common								
Emotion-focused CDC	3.55	.63	3.63	.71	3.55	.78	.55	-.00
Problem-focused CDC	3.24	.86	3.30	.80	3.32	.91	.88	-.00
Total DC	3.17	.32	3.20	.38	3.16	.42	.65	-.00

Notes. DC = dyadic coping, SDC = supportive dyadic coping, CDC = common dyadic coping. Bold numbers are significant at $p < .001$. Couples rated dyadic coping behaviors on a 5-point Likert scale (1 = *not at all/very rarely* to 5 = *very often*). There were different numbers of participants in each group: Husbands with high ($n = 93$), medium ($n = 340$), and low ($n = 41$) income; and wives with high ($n = 45$), medium ($n = 348$) and low ($n = 81$) income. Bold numbers are significant at $p < .001$.

are engaging in higher levels of dyadic coping, because these couples are facing higher levels of stress.

Dyadic coping and relationship satisfaction. The association between use of dyadic coping strategies and relationship satisfaction was examined using the RAS. Participants responded to the seven items of this measure using a scale ranging from 1 (low) to 5 (high). The internal consistency of the Chinese translation was good for men ($\alpha = .88$) and women ($\alpha = .92$). As illustrated in Table 12, total dyadic coping scores and scores on all sub-scales of the DCI except negative dyadic coping by self and partner predicted relationship satisfaction. Effect sizes were moderate and the variance in relationship satisfaction explained by the scales ranged from 16% to 23%. Common dyadic coping explained the most variance in relationship satisfaction (23% for husbands and 22% for wives), suggesting that this may be the most important dyadic coping behavior for Chinese couples' satisfaction. Wives' dyadic coping behaviors explained more variance than those of husbands, suggesting that the behavior of wives during times of stress may be more important for couples' satisfaction than that of husbands. Common dyadic coping may be the most relationship-enhancing coping strategy for Chinese couples, because collectivistic cultures place a high value on working harmoniously within a network of relationships. Wives' support behaviors may have greater impact on the couple's relationship satisfaction, because as delineated in the STM, appraisals of the partner's coping are an important determinant of outcomes. Since Chinese women's culturally defined role is to support their husbands, dyadic coping behaviors by wives are

likely to be appraised particularly positively by both partners and the absence of these is likely to provoke further distress and disappointment.

Table 12
Prediction of Chinese Couples' Relationship Satisfaction from Dyadic Coping Behaviors

	Husbands n = 474					Wives n = 474				
DCI scales	ΔR^2	B	SE	β	p	ΔR^2	B	SE	β	p
Oneself										
Stress communication	.06	.13	.02	.24	**.00**	.10	.15	.02	.31	**.00**
Emotion-focused SDC	.08	.14	.02	.29	**.00**	.10	.14	.02	.30	**.00**
Problem-focused SDC	.06	.13	.02	.25	**.00**	.05	.11	.02	.23	**.00**
Delegated DC	.06	.12	.02	.24	**.00**	.03	.09	.02	.18	**.00**
Negative DC	.01	-.04	.02	.10	.03	.00	-.01	.02	.03	.54
Partner										
Stress communication	.06	.13	.02	.25	**.00**	.10	.16	.02	.32	**.00**
Emotion-focused SDC	.11	.15	.02	.33	**.00**	.14	.16	.02	.37	**.00**
Problem-focused SDC	.07	.12	.02	.27	**.00**	.09	.14	.02	.30	**.00**
Delegated DC	.06	.10	.02	.25	**.00**	.07	.12	.02	.27	**.00**
Negative DC	.00	-.03	.02	.08	.06	.00	-.03	.02	.09	.05
Common										
Emotion-focused CDC	.14	.18	.02	.37	**.00**	.13	.20	.02	.37	**.00**
Problem-focused CDC	.23	.20	.01	.46	**.00**	.18	.17	.02	.43	**.00**
Total										
DC total by Oneself	.06	.22	.04	.24	**.00**	.09	.26	.04	.30	**.00**
DC total by Partner	.08	.22	.04	.28	**.00**	.11	.27	.03	.33	**.00**
Total score of CDC	.23	.26	.02	.48	**.00**	.22	.26	.02	.46	**.00**
Total DC	.16	.36	.04	.39	**.00**	.20	.41	.04	.44	**.00**

Notes. DC = dyadic coping, SDC = supportive dyadic coping, CDC = common dyadic coping. Bold numbers are significant at $p < .001$. Couples rated dyadic coping behaviors on a 5-point Likert scale (1 = *not at all/very rarely* to 5 = *very often*). SE = standard error.

In summary, our administration of the DCI to mainland Chinese couples revealed generational, regional, and socioeconomic group differences suggestive of an inhibitory effect of traditional values on dyadic coping behaviors. That is, lower levels of many of the dyadic coping behaviors were reported by rural husbands and wives, and older wives, whose values are likely to be more traditional than those of younger and urban Chinese. Husbands with higher incomes (who may be considered to be fulfilling their traditional provider role) were less likely than husbands with lower incomes to do their partner's tasks or help her to see a problem in a different light. However, higher levels of dyadic coping were associated with higher relationship satisfaction, particularly dyadic coping by wives.

Discussion

Implications for Practice

The research presented above has implications for couple therapists and relationship educators working with Chinese couples around the world who have been influenced by their heritage culture. The extent of this influence should be assessed at the commencement of therapy in order to determine the appropriateness of cultural adaptations. Stress is likely to be communicated indirectly in Chinese couple relationships due to the cultural emphasis on *Han Xu*. Although Chinese partners are likely to be more skilled in perception and interpretation of indirect communication than Western partners due to socialization in this communication style (see Chapter 2), the risk of misinterpretation may nonetheless be greater. As discussed previously, Chinese are more likely to respond to support seeking with dismissal and escape from the negative feelings. However, perception of these responses as appropriate support strategies may reduce negative appraisals of such responses and result in a lessening of their negative impact on the couple relationship. In addition, a lower value on intimacy and greater valuing of face maintenance may reduce the likelihood of Chinese couples engaging in emotion-focused supportive dyadic coping. However, lower levels of emotion-focused supportive dyadic coping may have a greater positive impact on Chinese partners than Western partners, because such behavior may be perceived as a greater support effort by the partner. These issues need to be considered when conceptualizing Chinese couples' responses to stress using the STM.

When working with couples in Mainland China, practitioners need to be aware of the stressors that the rapid pace of development has placed upon couples. In addition, Mainland Chinese couples appear to engage in relatively low levels of dyadic coping, particularly those from demographic backgrounds that indicate greater exposure to traditional Chinese values and lower exposure to Western values. This suggests that these couples face barriers to use of

dyadic coping that need to be understood and overcome if the couple's current approach to stress is adversely affecting their relationship and well-being, potentially through re-appraisal of the meaning of dyadic coping. The positive association between dyadic coping and relationship satisfaction in Mainland Chinese couples suggests that they may benefit from learning about dyadic coping strategies, particularly common dyadic coping, which we found to be the best predictor of satisfaction. To increase engagement in common dyadic coping, couples could be encouraged to appraise stressors as concerning both partners and primarily caused by external conditions. This is compatible with the known Chinese tendency to engage in external attributions and perceive relationship partners as interdependent (Nisbett, 2003). Such an approach would be applicable to Chinese partners of all age groups and socio-economic backgrounds.

Couple therapy has only been practiced in China for two decades (Miller & Fang, 2012) and is therefore not an established pathway for seeking relationship assistance in Mainland China. Revelation of negative information about the family to outsiders is considered disloyal (Shi & Wang, 2009). Therefore, couples tend to seek professional help only when their situation is severe and shame may prevent them from fully disclosing their problems (Shi & Wang, 2009). This means that stress is likely to be a relevant issue for all couples seeking therapy and negative dyadic coping may not be disclosed. Accordingly, assessment of dyadic coping in a non-confrontational way, such as by use of self-report measures like the DCI (Xu et al, manuscript under review), is an important part of intake assessment. Since education is highly valued by Chinese (Huang & Gove, 2012), relationship education programs may provide a socially acceptable way for Chinese couples to access professional relationship assistance.

Couples Coping Enhancement Training (CCET; Bodenmann & Shantinath, 2004) is a relationship education program that has been demonstrated to reduce marital distress and

increase marital satisfaction in Western couples, and therefore may be beneficial for Chinese. However, we recommend caution when delivering the content designed to strengthen explicit communication about stress, including emotional self-disclosure and emotion-focused support. Educators should not imply that traditional Chinese ways of communicating and providing support are incorrect, since these are untested in research, and this may lead to feelings of invalidation and rejection of the program. Instead, educators could present CCET techniques as strategies couples could add to their repertoire of stress management approaches. Educators may need to explain the positive purposes that explicit communication strategies can serve, since Chinese communication norms may lead participants to interpret these negatively. CCET also encourages couples to establish boundaries around their relationship. Research has demonstrated lower desire for boundaries around the couple relationship amongst Chinese couples compared to Western couples (Epstein, Chen, & Beyder-Kamjou, 2005). Therefore, educators need to assist Chinese couples to identify a mutually satisfactory level of separation from the extended family and allow this to be low if partners' reports indicate that this is functional for them.

Implications for Research

Research findings suggest that younger age (for women), urban residence, and lower financial contribution to the household by the male partner are associated with more frequent use of dyadic coping. As discussed above, lower endorsement of traditional Chinese values is a potential cause of the more frequent dyadic coping of these groups. The associations between traditional Chinese values, Western values, socio-economic variables, and dyadic coping would be an interesting topic for further research. These socio-economic differences in dyadic coping also highlight the importance of recruiting couples from a variety of age groups, locations, and income levels, particularly in a country with vast geographic differences such

as China. For example, if the present research had recruited only young urban couples, a falsely high use of dyadic coping by Chinese couples would have been found.

Couples in the present research reported low relationship satisfaction. Despite this truncated range, we found associations between dyadic coping and relationship satisfaction, and between dyadic coping and age, location, and income level. However, future research with a wide range of satisfaction levels may reveal more and stronger associations. Furthermore, the cross-sectional design of the current study could not identify the direction of causality between dyadic coping behaviors and relationship satisfaction. Longitudinal studies are required to determine whether higher dyadic coping leads to higher relationship satisfaction or whether the reverse or both are true. Assessment of socio-demographic variables in longitudinal research could also provide data on the associations between the rapid economic developments in China and couple relationship processes. Research indicating that external social support plays an important role in Chinese couples' coping with stress suggests an extension of the STM to include the network of relationships within which the couple exists. Future studies could examine whether such a model explains a greater proportion of variance in collectivistic couples' satisfaction.

Conclusion

In conclusion, Chinese couples face a number of stressors due to the pressures of a rapidly developing economy (Chen et al., 2010) and conflict between Chinese and Western values (Quek et al., 2010). This chapter has described ways in which the STM (see Chapter 1) may explain associations between stressors and Chinese couple relationship outcomes found in past research, and presented the first study of age, location, and income level differences in dyadic coping in China. Demographic differences in dyadic coping behaviors suggest potential cultural barriers with the use of dyadic coping strategies and the need to assist distressed couples to re-appraise the use of such strategies. The prediction of Chinese

spouses' relationship satisfaction from dyadic coping suggests that educating Chinese couples about the use of these strategies may have powerful effects on their subjective well-being. These effects seem likely to become stronger with time, as the influence of Western values and lifestyle increases.

9 Study 3 Testing Stress and Dyadic Coping Processes in Chinese Couples[9]

Abstract

Previous empirical studies show that stress occurring outside of the relationship (referred to as external stress) can spill over into couples' relationships, influencing dyads' behaviors and their relationship satisfaction. There is substantial evidence that the association between external stress and relationship satisfaction is explained by two mediators: internal stress and dyadic coping. However, the mediation processes of internal stress and dyadic coping have solely been examined in Western couples. Accordingly, the current study aimed to test these processes in a sample of 474 Chinese couples (N = 948) using the actor-partner interdependence mediation model. Results reveal that internal stress and dyadic coping can fully mediate the association between external stress and relationship satisfaction in Chinese couples for men and women in a similar way. These findings underscore the importance of moving beyond examining stress and dyadic coping processes among couples in Eastern cultures.

Introduction

Stress originating outside of couples' relationships (external stress) can spill over into their relationships (Repetti, 1989) and affect their levels of relationship satisfaction (Buck & Neff, 2012; Randall & Bodenmann, 2009). The way in which external stress affects their relationship satisfaction can be explained by two mediators: internal stress and dyadic coping (e.g., Bodenmann, Ledermann & Bradbury, 2007; Hilpert, Kuhn, Anderegg, & Bodenmann, 2015). Thus far, researchers have tested stress and dyadic coping processes mainly in Western couples. Less is known whether these mediation effects are also functional for couples living in Eastern cultures (e.g., Chinese), for whom familial interdependence is extremely

[9] This study is in press (International Journal of Stress Management).

emphasized (Chen & Li, 2007). Moreover, studies show that men and women have different behavioral patterns in stress and coping processes (Bodenmann et al., 2015) and these patterns should thus be further explored in Chinese couples. Accordingly, the goal of the study was to explore stress and dyadic coping processes in a sample of Chinese couples which would expand the knowledge for researchers and practitioners in assisting couples with diverse cultural backgrounds in coping with stress.

The Theoretical Model Explaining Stress and Dyadic Coping Processes

Couples' stress and coping processes have long been an important research topic for family researchers in Western countries. Based on the interdependent and reciprocal effect of couples' susceptibility to stressors, the Systemic Transactional Model (STM; Bodenmann, 2005) was developed to explain couples' stress and coping processes. The STM is a conceptual model which suggests that one partner's external stress can spill over into the relationship and affect their stress reactivity as well as partner's corresponding coping behaviors (Hilpert et al., 2015; Wunderer & Schneewind, 2008), which subsequently affects relationship outcomes (e.g., relationship satisfaction; Buck & Neff, 2012; Herzberg, 2013). In interpreting the effects of stress and coping processes on relationship functioning, the STM highlights two mediators: internal stress and dyadic coping. *Internal stress* refers to perceived differences between spouses in relation to life needs, goals, values, and personality traits. Internal stress can further cause arguments and conflicts within the relationship. The role of internal stress in the mediation process is as follows: external stress exacerbates couples' personal drawbacks (e.g., hostility, intolerance) and conflict interactions (e.g., negative communication, negligence of spouses' emotions), which decreases the level of intimacy and increases dissatisfaction between partners (Ledermann, Bodenmann, Rudaz, & Bradbury, 2010; Bodenmann et al., 2007). Furthermore, several empirical studies suggest that internal

stress is a robust mediator between external stress and relationship satisfaction (Hilpert et al., 2015; Bodenmann et al., 2007; Ledermann et al., 2010).

Further, stress spillover effects can activate couples' dyadic coping behaviors. As an extension of individual coping efforts, *dyadic coping* is defined as a systemic and interdependent process between one stressed partner and his or her spouse who can potentially provide support (Bodenmann, 2005; Revenson & Lepore, 2012). The STM argues that dyadic coping is a coping resource which is beneficial for couples by helping the stressed person to alleviate stress reactivity and increase intimacy and relationship satisfaction (Bodenmann, 2005). Utilizing dyadic coping resources, couples are interdependent to cope with external stress that might impair relationship functioning, which can protect themselves from activating internal stress. Several lines of research reveal that dyadic coping is positively associated with relationship satisfaction (see a meta-analysis, Falconier, Jackson, Hilpert, & Bodenmann, 2015) and can mediate the association between external stress and relationship satisfaction in Western couples (Donato et al., 2015; Hilpert, Nussbeck, Bodenmann, & Bradbury, 2013; Hilpert et al., 2015; Wunderer & Schneewind, 2008). Nevertheless, less is known about how these mediation processes function beyond Western couples.

A Cultural Perspective of Stress and Coping Processes in Chinese Couples

Couples in China are affected by collectivism, Confucianism and contemporary values (Shek, 2006; Quek, Knudson-Martin, Rue, & Alabido, 2010; Xu & Hiew, 2016). *Collectivistic* culture purports that group goals are valued above personal goals (Oyserman, Coon, & Kemmelmeier, 2002) and maintaining harmonious relationship with others is crucial (Marshall, 2008), which is especially important for married couples (Ebrey, 2006; Shek, 2006; Xu & Hiew, 2016). *Confucianism* prescribes distinct gender roles for couples: husbands are breadwinners and should be seen as the head in the family whereas wives are responsible for the household and parenting (Ebrey, 2006; Zuo, 2003). However, since the Chinese

government has launched up the open-up policy to foreign countries for several decades, the Chinese population is in a transition to more *contemporary values* as a consequence of economic advancement and the consistent exposure to Western values (Xu & Hiew, 2016). The contemporary value highlights an egalitarian gender role for couples (Quek et al., 2010). Notably, the value of the equal gender role becomes more and more accepted among Chinese couples as Chinese men and women have equal education and job opportunities (Shek, 2006; Xu & Hiew, 2016). For instance, several studies show that a majority of Chinese couples are dual earners (around 85%; Ling & Powell, 2001; Zhang, Foley, & Yang, 2013). This transition might also affect marital expectations and behavioral exchanges in Chinese couples.

Understanding cultural and contemporary influences on Chinese couples renders us to make predictions about their stress and coping processes. Based on the traditional values, we can predict distinct gender differences in stress and coping processes. As husbands traditionally have a higher family status, they can enact more conflict behaviors and expect more support from their wives (e.g., Chen & Li, 2007). However, nowadays, the 4-2-1 pattern in the Chinese family is a universal phenomenon (couples' parents-two members of the couple-one child, Hesketh, Lu, & Xing, 2005). As a result, the demands and expectations on dual-earner couples with younger children is so high that family responsibilities are more and more equally shared between partners (Xu & Hiew, 2016). Thus, in terms of the transition from traditional cultures to modern values we can expect to hardly find gender differences in young couples who are born after the 1980s (Shu & Zhu, 2009). It indicates that partners may be more vulnerable to daily life stressors and therefore expect and exchange similar coping behaviors.

Current Study

In order to examine how external stress can spillover into relationships, we mainly focus on couples who are supposed to experience higher levels of stress - dual-earner couples

with younger children. We hypothesized that internal stress would significantly mediate the association between external stress and relationship satisfaction (H1a) and predicted that the negative effect of own stress on own relationship satisfaction was equally mediated by internal stress for men and women (H1b). Moreover, we hypothesized that dyadic coping would significantly mediate the association between external stress and relationship satisfaction (H2a); we further expected to find the same mediation mechanism of dyadic coping for men and women (H2b).

Method

Participants and Procedure

Couples were recruited in three metropolitan cities (Beijing, Shanghai, and Guangzhou) and several southern and northern provinces (e.g., Guangdong, Jiangsu, Shanxi, Jiangxi and Sichuan) by distributing flyers at parents' meetings in schools, and to administrative managers of different enterprises (civil institutions, companies, schools, and hospitals). Participants had to meet the following criteria in order to be able to participate: (i) married and living with a partner for at least one year; (ii) over 22 years of age for males and over 18 years of age for females (legal ages to marry in China). Interested couples who met the inclusion criteria received separate letters including information about the study, participation agreement, the questionnaires, and two pre-addressed and stamped envelopes. Couples were instructed to sign the participation agreement, fill out their questionnaires separately and send the papers back in separate envelopes. Participants were notified that their data would be kept anonymous and confidential for scientific purposes.

Research assistants distributed 1000 flyers at parents' meetings in schools and to administrative managers of different enterprises. Overall, 600 couples responded to the flyers and questionnaires were sent to them but 501 couples (84%) sent the questionnaires back. After screening the data, 27 couples (5.4%) were excluded from the data analysis because

they either did not fill out the questionnaires properly or husbands and wives' answers were identical. The final sample includes data from 474 couples (N = 948, more information about demographics see Table 13). The husbands' mean age was 36.5 years (SD = 7.7) and the wives' mean age was 34.4 years (SD = 7.3). On average, couples had been married for 9.4 years (SD = 7.9). Eighty-four percent of the couples (398 couples) had at least one child (M = 1.0, SD = .66, range 0-3[10]). On average, husbands earned a monthly salary of 6,000 to 10,000 CNY (approximately $1,000 to $1,700 USD) whereas wives earned around 2,000 to 6,000 CNY (approximately $350 to $1000 USD)[11]. Only 2% of the wives were unemployed and reported being housewives; all other participants worked full time. In all, the features of demographics show that our sample was similar to the Chinese population in terms of income, job type, and number of children but our sample had a better education level than the nation average[12]. All the procedures are primarily approved by the researchers' university Institutional Review Board.

Measures

Demographics. Participants reported their age, marital duration, education, monthly income, number of children, job type, job position, and area of residence.

External stress and internal stress. In order to assess external and internal stress, we translated the English version of the Multidimensional Stress Questionnaire for couples into

[10] In rural areas, couples are allowed to raise more than one child.

[11] According to reports released by the Ministry of Human Resources and Social Security of China in 2014, the average salary varies from city to city on the basis of the economy level. The average salary in developed areas, like Beijing and Shanghai, can reach more than 4,000 to 8,000 CNY per month (around 700 to 800 USD), while the average salary in less developed areas, like Western parts of China, just range from 1,000 to 3000 CNY (around 160 to 500 USD). Thus, our participants' average salary falls into the category of the middle class. In addition, according to reports and the Ministry, in general, Chinese couple work full time with 8 hours per day, which can guarantee their social welfare. Husbands earn more in our sample than women. This is mainly due to the fact that men hold higher positions than wives (see Table 1).

[12] According to the government report about the sixth national population census, the average education level of the Chinese population is middle school.

Chinese (MSQ-C; Bodenmann et al., 2007). The MSQ-C assesses external stress with eight items and internal stress with ten items. Participants report first about external stress (e.g.,

Table 13
Characteristics of the Couples

Characteristics	Husbands (*n* &%)	Wives (*n* &%)
Age (in years)		
20-29	92(19%)	157(33%)
30-39	248(52%)	207(44%)
40-49	101(21%)	95(20%)
50-59	32(7%)	15(3%)
Above 59	1(1%)	-
Number of children		
0	76(16%)	76(16%)
1	339(72%)	339(72%)
2	44(9%)	44(9%)
3	15(3%)	15(3%)
Education level		
Postgraduate	91(19%)	84(18%)
Undergraduate	191(40%)	176(38%)
Vocational college (three-year)	111(24%)	130(27%)
Middle school or below	81(17%)	84(17%)
Monthly income level (CNY)		
900~2000	45(9%)	85(8%)
2001~6000	210(44%)	222(47%)
6001~10000	138(29%)	118(25%)
10001~15000	61(13%)	33(4%)
Above 15000	20(4%)	8(2%)
No salary	-	8(2%)
Occupation		
Civil servants and public institutions	163(35%)	180(38%)
The state-owned enterprises	66(14%)	66(14%)
Private or foreign companies or factories	158(33%)	170(36%)
Self-employed , entrepreneurship, and others	85(17%)	47(10%)
Retired	2(1%)	4(1%)
Unemployed	-	7(2%)
Occupational status		
Lower white-collar	309(65%)	367(78%)
Middle white-collar	132(28%)	86(18%)
Higher positions (e.g., manger, chairperson)	33(7%)	14(3%)
Unemployed	-	7(2%)
Residence		
Urban areas (cities and counties)	386(81%)	386(81%)
Rural areas (villages)	88(19%)	88(19%)
Marital duration		
1-9	262(60%)	260(60%)
10-19	109(22%)	112(24%)
20-29	62(13%)	62(13%)
30-39	14(3%)	13(3%)

work stress, financial problems, social contacts with colleagues and friends, parenting) and then respond to questions about experiences of internal stress (e.g., differences of opinion with your partner, unsatisfactory distribution of duties and responsibilities) over the past 12 months. An aggregated score (either eight items for external stress or ten items for internal stress) represents an individual's external or internal stress level respectively. All the scales are rated on a four-point Likert scale (1 = *not at all stressful* to 4 = *very stressful*). Two bilinguals (English and Chinese) first translated the published English version of MSQ-C to Chinese and then back-translated it to English to edit an accurate Chinese version. Internal consistency was acceptable for external stress (.69 for wives and .69 for husbands) and good for internal stress (.75 for wives and .80 for husbands).

Dyadic coping. We used the validated Chinese version of the Dyadic Coping Inventory (DCI; authors, in press) to assess dyadic coping behaviors. Couples rated how often they (self) and their partners (partner) engaged in stress communication and dyadic coping (DC) strategies on a five-point Likert scale (1 = *not at all/very rarely* to 5 = *very often)*. The validated Chinese version of DCI contains five subscales (stress communication, supportive DC, delegated DC, negative DC and common DC), with two additional evaluation items for measuring the efficiency of using DC skills. For the present study, we assessed Chinese couples' perception of the usage of three positive forms of dyadic coping skills (Bodenmann, 2005, 2008) through aggregating the following three subscales with a total of 12 items: supportive dyadic coping by partner (where one partner voluntarily helps the stressed spouse: e.g., *My partner helps me to see the stressful situations in a different light*); delegated dyadic coping partner (where one partner is explicitly asked to provide support: e.g., *I take on things that my partner would normally do in order to help him/her out*), and common dyadic coping (where both partners engage in communal problem-solving activities: e.g., *We try to cope with the problem together and search for ascertained solutions*). A meta-analysis of studies

concerning the association between dyadic coping and relationship satisfaction provides strong evidence that all three forms of positive dyadic coping strongly predict Western couples' relationship satisfaction (Falconier et al., 2015). The internal consistency of the aggregated scale in the current study was α = .90 for wives as well as for husbands.

Marital satisfaction. To assess relationship satisfaction, we made use of the validated Chinese version (Wang et al., 2012) of the Relationship Assessment Scale (RAS; Hendrick, Dicke, & Hendrick, 1998). The seven-item RAS is rated on a five-point scale asking spouses to rate the extent to which they are satisfied or dissatisfied with their marital situation (e.g., *In general, how satisfied are you with your relationship*). In the present study, the internal consistency is α = .90 for wives and α =.88 for husbands.

Statistical Analysis

We used an actor-partner interdependence mediation model (APIMeM; Ledermann, Macho, & Kenny, 2011) to test the hypotheses. The APIMeM approach allows us to model the interdependence between husbands' and wives' factors through specifying both actor and partner effects as well as simultaneously including mediators of internal stress and dyadic coping (see Figure 2). The model was developed in a stepwise procedure. First, we specified a saturated model with all variables, including a variety of control variables such as marital duration, area of residence, education level, income level, job type and positions as well as number of children. In order to simplify the model, control variables would be removed from the model if they did not significantly predict any variable. Second, we explored gender differences through comparing the saturated model, where paths were allowed to vary freely, with a model where actor and partner effects were constrained to be equal across gender. Given that the constrained model did not worsen the model fit relative to the unconstrained model using a chi square difference test, we maintained the more parsimonious model with invariant effects across gender. In addition, a complete mediation effect would be identified if

the total indirect effect between the one predictor and one outcome (e.g., external stress and dyadic coping) is non-zero and the direct effect between the same predictor and outcome (e.g., external stress and relationship satisfaction) is zero (Ledermann et al., 2011).

However, it is crucial to note that there are several mediation paths (see Figure 1), but we only tested the conceptually meaningful pathways. The meaningful paths involve (i) own external stress; (ii) perceived own and the partner's dyadic coping or internal stress as a response to own external stress; and (iii) own relationship satisfaction. These indirect paths are conceptually meaningful because they are linked by the inherent dynamics (i.e., my external stress can intensify my own and my partner's perception of internal stress and anticipate my own or my partner's dyadic coping behaviors). There are other indirect paths, but they are less interpretable because they involve different situations (e.g., the effect of the linkage between one partner's external stress and my own internal stress or dyadic coping to predict my own relationship satisfaction). Thus, the current study tested those indirect paths which are conceptually and empirically contributive to understand stress spillover effects on Chinese couples.

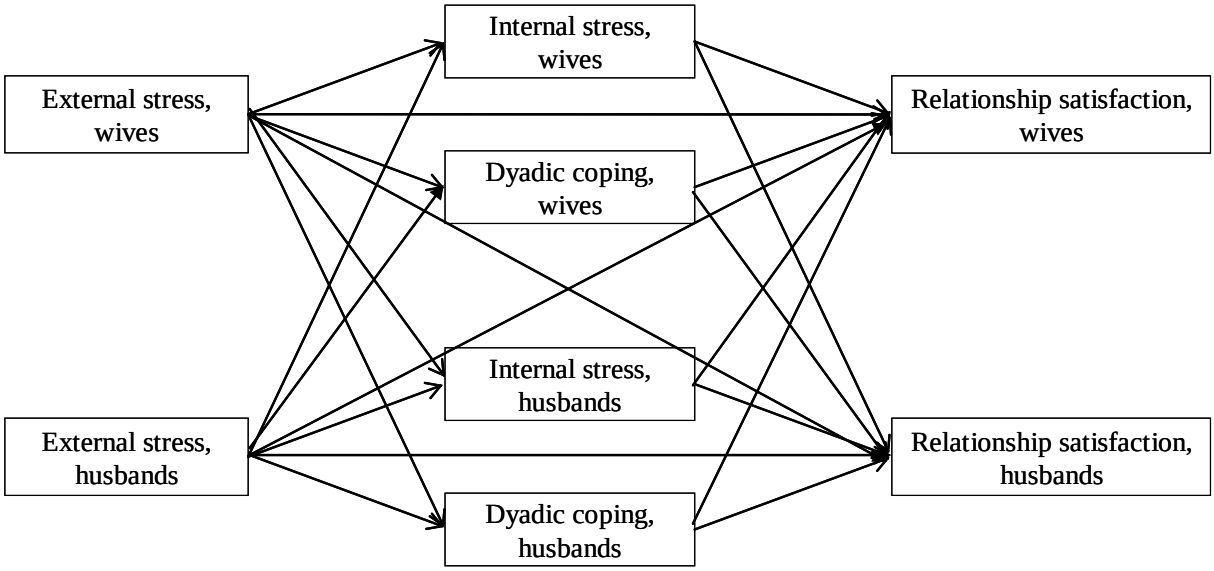

Figure 2. The Conceptual Model
Note. The APIeM conceptualizes Chinese couples' internal stress and dyadic coping as mediators between external stress and relationship satisfaction. Control variables were tested

for by adding them as exogenous variables with all study variables. Correlations and residual covariances between the study variables were calculated but are uncharted.

The statistical software package R (R version 3.1, R Core Team) was used to compute descriptive statistics. To compute the APIMeM, we used the lavaan package 0.5-16 (Rosseel, 2012) in R. We relied on common fit indices to test the model fit of the data: chi square (χ^2), root mean square error of approximation (RMSEA), comparative fit index (CFI) and standardized root mean squared residual (SRMR). A good model to data fit is indicated by CFI above .95, RMSEA smaller than .05, and SRMR smaller than.08 (Marsh, Hau, & Wen, 2004). We used full information maximum likelihood to deal with missing data. As in general one cannot assume a normal distribution of all the indirect effects, we reported the bootstrapped (5000 times) standard errors (Preacher & Hayes, 2008).

Results

Descriptive Analysis

Table 14 presents means, standard deviations, and inter-correlations for all study variables. Wives reported significantly higher scores of internal stress (p = .01), indicating that wives may perceive more internal stress than their partners. Furthermore, husbands reported significantly higher scores of dyadic coping in comparison to their wives (p = .01). Although these mean differences were significant, effect sizes were small ($d_{\text{internal stress}}$ = .05; $d_{\text{dyadic coping}}$ =.13). Furthermore, all variables were correlated in the expected directions: external stress and relationship satisfaction (r_{Wives} = -.22; r_{Husbands} = -.16); internal stress and relationship satisfaction (r_{Wives} = -.31; r_{Husbands} = -.33); dyadic coping and relationship satisfaction (r_{Wives} = .39; r_{Husbands} = .37).

Main Results

We first tested two conceptual models with and without all control variables. None of the control variables had any significant effect and were therefore dropped from the two

competing models. The chi-square difference test shows that the model with constraining the paths to be equal across gender was not worse than the model allowing all paths to be freely estimated (χ^2 (9) = 9.37, p = 0.41). Thus, the constrained model fitted the data well (χ^2 (10) = 15.16, p = .13, CFI = .99, RMSEA = .03 (CI = .00, 06), SRMR = .03).

Direct effects. Table 15 shows all the results. As the constrained model fitted the data well, we conclude that there were no gender differences in stress and dyadic coping processes in Chinese couples. In more detail, although we found mean level differences in internal stress and dyadic coping across gender, yet no gender differences were found when examining how these variables were associated with each other. Second, direct paths from both gender' external stress to relationship satisfaction were not statistically significant (β_{actor} =.01, p = .85; $\beta_{partner}$ = -.05, p = .12). Associations between external stress and internal stress for both actor and partner effects were significant (β_{actor} =.12, p = .00; $\beta_{partner}$ = .52, p = .00). Moreover, internal stress negatively predicted relationship satisfaction (β_{actor} = -.15, p = .00; $\beta_{partner}$ = -.09, p = .01), whose negative impact was confirmed. Third, dyadic coping behaviors were negatively associated with external stress in both actor and partner effects (β_{actor} = -.08, p < .03; $\beta_{partner}$ = -.15, p < .00). However, positive associations between dyadic coping and relationship satisfaction were only established in actor effects for both gender (β = .25, p < .00) instead of in partner effects for both gender (β = .04, p < .19), suggesting that only spouses' positive dyadic coping behaviors (e.g., supportive DC or common DC behaviors)

Table 14

Descriptive Statistics and Correlations among All Studied Variables

	Descriptive statistics						Correlations			
	Wives		Husbands				Variables			
Variables	*M*	*SD*	*M*	*SD*	*p*	*d*	1	2	3	4
1 External stress	2.39	.49.	2.35	.48	.07	.08	**.38**	**.55**	**-.16**	**-.22**
2 Internal stress	2.39	.47	2.32	.50	**.01**	.12	**.59**	**.37**	**-.30**	**-.33**
3 Dyadic coping	3.46	.45	3.52	.46	**.01**	.13	**-.12**	**-.28**	**.36**	**.37**
4 Relationship satisfaction	3.42	.50	3.47	.51	.12	.05	**-.22**	**-.31**	**.39**	**.38**

Note: Correlations above the diagonal are for husbands and below the diagonal are for wives. Correlations between husbands and wives are shown between the diagonal. *d* = Cohen's d. Significant correlations are in bold ($p < .05$; two-tailed).

Table 15
Direct Effects and Indirect Effects for the APIeM

	Estimate	SE	*z*	*p*	CI 95% bias-corrected
Direct effects					
Actor effects					
ES → RS	.01	.04	.19	.85	[-.07, .08]
IS → RS	**-.15**	.04	-3.77	**.00**	[-.22, -.07]
DC → RS	**.25**	.04	7.17	**.00**	[.18, .32]
ES → IS	**.12**	.03	3.78	**.00**	[.06, .18]
ES → DC	**-.08**	.04	-2.17	**.03**	[-.15, -.00]
Partner effects					
ES → RS	-.05	.04	-1.54	.12	[-.12, .02]
IS → RS	**-.09**	.04	-2.50	**.01**	[-.16, -.02]
DC → RS	.04	.03	1.33	.19	[-.02. .10]
ES → IS	**.52**	.03	15.71	**.00**	[.46, .59]
ES → DC	**-.15**	.04	-3.65	**.00**	[-.23, -.07]
Indirect effects					
Actor-actor effects					
ES → IS → RS	**-.08**	.02	-3.67	**.00**	[-.12, -.03]
ES → DC→ RS	**-.04**	.01	-3.03	**.00**	[-.06, -.01]
Partner-partner effects					
ES → IS → RS	-.01	.01	-1.43	.15	[-.03, .00]
ES → DC→ RS	-.03	.02	-1.36	.26	[.00, .01]

Note: SE = standard error; ES = external stress; IS = internal stress; RS = relationship satisfaction; DC = dyadic coping; CI = confidence interval. As final results (standardized analyses) reveal no gender differences, regression weights are identical for husbands and wives and are reported only one time. Significant coefficients are in bold ($p < .05$; two-tailed).

can improve their own relationship satisfaction[13].

Indirect Effects. In accordance with our main hypotheses, we assumed that Chinese couples' internal stress and dyadic coping would mediate the association between external stress and relationship satisfaction through two conceptually interpretable pathways: the actor-actor effect and the partner-partner effect. The actor-actor effect indicates that both wives' and husbands' own external stress can decrease or improve their sense of relationship satisfaction via their own perception of internal stress and dyadic coping. Results support the

[13] We tested a post-hoc model if the stress-coping processes might be different for couples with children (n = 398) and without children (n = 76) in a multi-group APIMeM model. The model constraining all paths to be equal between couples with and without children fitted the data well, showing that there are no group differences. Therefore, we included all couples in the final model.

actor-actor assumption for both gender ($\beta_{\text{internal stress}}$ = -.08, p < .00; $\beta_{\text{dyadic coping}}$ = -.04, p < .00). Thus, the more both partners employed positive dyadic coping skills, the more they would be satisfied with their relationship. In contrast, the partner-partner effect indicates that the negative effect of wives' own external stress on relationship satisfaction can be potentially influenced or alleviated via their partners' internal stress and dyadic coping. Results did not support the proposed effect for either gender ($\beta_{\text{internal stress}}$ = -.01, p = .15; $\beta_{\text{dyadic coping}}$ = -.03, p = .26). One explanation is that direct partner effects of dyadic coping on relationship satisfaction were not significant.

Because the magnitude of the mediation effect of internal stress appeared to be stronger than that of the mediation effect dyadic coping, we compared these two mediation effects by constraining the indirect paths to be equal in a post-hoc model test. The chi-square difference test shows that internal stress is a stronger mediator for the stress spillover effects (χ^2 (11) = 16.27, p = 0.01).

Discussion

According to the STM, internal stress and dyadic coping function as explaining mediators for the link between external stress and relationship satisfaction. However, family researchers need to explore these effects beyond Western samples to consolidate the established model and meanwhile test for gender differences in these effects. To address this gap, utilizing a sample of community-dwelling Chinese couples, the current study sought to examine stress and dyadic coping processes in an Eastern culture.

The effect sizes (see Table 13) show that gender differences in how Chinese couples perceived the stress-coping processes were subtle. This indicates that both men and women may experience similar levels of stress and perceive similar levels of partner's behavior, which in turn explains the fact that both partners have a relatively similar level of relationship satisfaction. Hardly establishing gender differences in mean level differences of the study

variables provides initial evidence for our assumption that the couples of our age group have gone through the transition from traditional cultures to contemporary values. Thus, couples may perceive the same amount of stress and dyadic coping in a similar way.

In relation to direct effects, all direct pathways were significant with two exceptions (see Table 14). First, although external stress and relationship satisfaction correlated significantly with each other, this association was no longer significant when we included the mediator variables in the model, indicating that the mediators can fully explain the association between external stress and relationship satisfaction. Second, we did not find significant partner effects between dyadic coping and relationship satisfaction, replicating a previous study with Western couples (Hilpert et al., 2013). In addition, findings show that the associations between the variables are equal across gender, further supporting the assumption that Chinese husbands and wives may perceive similar levels of stress, coping behaviors, and relationship satisfaction. This means that the effect of external stress on own behavior is very similar between partners when reacting to stressors and perceiving partners' coping behaviors. We can conclude that under everyday stressful circumstances, modern Chinese couples demand coping resources from their partners to maintain their own psychological well-being.

In the subsequent steps, we tested if internal stress and dyadic coping could mediate the association between external stress and relationship satisfaction and the results support our hypotheses. These findings are in line with prior studies reporting that internal stress is a strong mediator in Western couples (e.g., Bodenmann et al., 2007; Ledermann et al., 2010). As for Chinese couples, external stress would have deleterious effect on their levels of relationship satisfaction through activating their perceptions of internal stress in a similar pattern. These findings also support our assumption that modern dual-earner couples reside in stressful environments where both are working full time and stress can hinder their adaptive relationship. Further, we assume that the lack of gender differences may be also due to the

severity of modern stressors, which might motivate them to ask for support. Several lines of studies report that Chinese couples consistently suffer several stressors in modern China, such as the soaring costs of accommodation (Chen et al., 2010) and the intergenerational stress of supporting their parents and children caused by the one-child policy (Hesketh et al., 2005; Shek, 2006). Should it be the case, both partners might be intolerant of stressors and demand coping resources from each other to cope with stress.

Dyadic coping can mediate the association between external stress and relationship satisfaction as well, which is in line with studies with Western couples (e.g., Hilpert et al., 2015; Donato et al., 2015). We want to further highlight that all mediators were entered in the model simultaneously, which means that the effect of a specific mediator is controlled for the effect of the other mediator. In order to reduce the negative effect of stress Chinese couples help each other to adapt to stressful situations by providing support to each other. Additionally, the lack of gender differences further denotes to the influences of contemporary values playing a pivotal role in shaping Chinese couples' stress reactivity and coping behaviors.

Although we found that internal stress and dyadic coping were mediators when testing actor-actor effects (own stress – perceived partner's behavior – own relationship satisfaction), yet we did not find the same pattern for partner-partner effects. This is conceptually sound as these mediation paths are not connected to individuals' own stressful experiences. Partner B's coping behaviors and sense of relationship satisfaction would be hardly influenced by Partner A' stressful experiences, especially when both partners are stressed. This highlights that the actor-actor mediation effects are conceptually validated mechanisms and these finding are consistent with studies with Western couples (e.g., Wunderer & Schneewind, 2008).

Finally, as we found that the magnitudes of the two mediation paths were different, we compared them in a post-hoc test. Results show that internal stress is a stronger mediator than

dyadic coping. This is surprising because maintaining relationship harmony is still highly valued for Chinese couples (Xu & Hiew, 2016). This finding is also contrary to findings with Western couples. For instance, Hilpert and colleagues (2013) reported that the mediation effect of dyadic coping was significantly stronger than couples' conflict behaviors. Thus, this finding might indicate that Chinese couples undergo higher levels of stressor which might exacerbate more internal stress (e.g., conflict interactions) between partners. Future work should examine whether dyadic coping can reduce the internal stress level.

Limitations

Several limitations have to be mentioned. First, our sample was mainly consisted of couples with relatively younger children. Therefore, results cannot be generalized to newlyweds or couples with older children. Second, couples, who were born in the 1970s, tend to be more traditional or collectivistic than couples born in the 1980s and 1990s, who tend to be more individualistic (Shu & Zhu, 2009). In order to account for this variability, we controlled for several important aspects (e.g., age, education, marital duration, number of children) to make the results more comparable. However, future studies should collect data from a more diverse generation group to examine stress and dyadic coping processes. Finally, it is not possible to draw causal conclusions about the underlying mechanisms based on our cross-sectional data. Future research should focus on designing longitudinal (e.g., dairy study) or experimental studies to deepen our understanding of stress and dyadic coping mechanisms in Chinese couples.

Theoretical and Practical implications

This study has theoretical implications for future research. For the first time we provided evidence that the STM, originated in Western couples, can be applied to couples in a typical Eastern culture. The results support the theoretical conceptualization of stress spillover and relevant dyadic coping behaviors beyond Western cultures (Bodenmann, 2005). Given the

application in Chinese couples, future studies should facilitate the STM to be applied to more cultural samples to consolidate our findings or provide other novel findings.

Furthermore, the current study indicates some practical implications for researchers and clinicians who work with Chinese couples. First, in terms of the cultural effects, practitioners should try to make couples be fully aware of the cultural doctrines that are constantly influenced by the modern society. As a consequence, Chinese couples may find the balance between traditional and modern cultural values which might be a stress for the partners. To keep the balance between the gender hierarchy and the equitable responsibilities assigned to men and women is extremely beneficial for maintaining their relationship satisfaction and well-being. In addition, adjusting traditional and modern values between partners is also quite important to maintain the harmony in the long run. Second, Chinese couples can be very sensitive to both external and internal stressors. Couple clinicians should take this fact into considerations when providing counseling to Chinese couples. Meanwhile, clinicians should attach more importance to couples' perception of internal stress as they seem to be more deleterious for their relationships. Clinicians can emphasize that couples should engage in dyadic coping to reduce the stress level. This thought is extremely meaningful and beneficial for Chinese couples who live in a collectivistic culture. Future research can implement relationship education programs to Chinese couples (see Halford & Bodenmann, 2013) to improve their conflict resolution and dyadic coping skills. However, these trainings need rigorous clinical studies and cultural adaptations (e.g., the communication style, the mode of providing support and factors of caring for children) before we can certify that they are functional and beneficial in the fast changing environment in China.

Conclusion

In sum, we confirmed mediating effects of internal stress and dyadic coping in the association between external stress and relationship satisfaction and tested gender differences

in these effects beyond Western cultures. Chinese couples who live in the collectivistic culture can regard dyadic coping behaviors as potential resources to cope with stress. In this way, for researchers and clinicians, the current study can be culturally illuminative for future investigations of stress and coping mechanisms in diverse groups and serves as a reference for designing culturally diverse therapy and prevention programs for couples.

10 Study 4 Mobilizing Support: Between-Person and Within-Person Variabilities in Chinese Couples[14]

Abstract

Individuals are willing to seek support from close others (i.e., intimate partner) when stressed and meanwhile this behavior is seen as culture-specific. Research shows that to maintain harmony Asians seek less support than Westerners. However, little is known about how the support-seeking behavior affects both the support-seeker and the support-provider regardless of cultures. The current study aims to address this issue under the intimate relationship context by disaggregating between-and within-person components of support mobilization and examining differential effects of these components on the seeker and the provider in the short- and long-term. Eighty-four Chinese couples (N = 168) reported their stress, support mobilization, and relationship satisfaction every evening for 7 days and their overall relationship satisfaction before the diary study and one year later. Results reveal that support mobilization was associated with relationship satisfaction in the short- and long-term. Notably, support mobilization had no negative effect on the provider.

Introduction

Individuals universally feel the need to seek support from their close others (e.g., intimate partner) after encountering stressors. Although many studies have examined how the supportive behavior of the partner helps the stressed person to deal with stress (e.g., Falconier, Jackson, Hilpert, Bodenmann, 2015), little is known about how the stressed person seeks support, which in turn affects the partner. In addition, prior studies show that Asians assume that seeking support would augment burdens on close others and impair the relational harmony with them (e.g., Taylor, 2007; Kim, Sherman, & Taylor, 2008). However, the actual relational costs of the support-seeker's behavior on the support-provider remains unknown in

[14] This study is under review.

intimate relationships. Thus, the goal of the current study is to test whether seeking support benefits for the seeker (actor effects) but negatively affects the relationship with the partner (partner effects) in a sample of Chinese couples.

Seeking Social Support: Theory and Findings in Intimate Relationships

In general, social support[15] is based on an interpersonal process between the support-seeker and the support-provider (Bodenmann, 2005; Kienle, Knoll & Renneberg, 2006). According to the Systemic Transactional Model (STM; Bodenmann, 2005), the stress of one partner affects the other partner because the stress can spillover into relationships and affect both partners (Randall & Bodenmann, 2009). Thus far, studies have solely focused on how the supportive behavior of the provider helps the stressed person to cope with stress (Cohen, 2004; Feeney & Collins, 2015) and evidence shows that perceived support is positively associated with the seeker's relationship satisfaction regardless of cultures (Falconier et al., 2015; Hilpert et al., 2016). Nonetheless, support has to be first activated by the stressed person and this first step of the stress-coping process has not been studied rigourosly in couples.

The process of seeking support after experiencing stress is characterized in three parts: (a) feeling the need for support, (b) mobilizing actively for support[16], and (c) the effects of mobilizing support on the support-seeker and the support-provider (Kienle et al., 2006). The *need for support* after encountering a stressor seems to be a universal phenomenon, as findings show no cultural differences (e.g., Pines & Zaidman, 2003). *Support mobilization*, however, is an effective approach in regulating stress reactivity (MacGeorge, Feng, & Burleson, 2011). In order to get support, the seeker has to actively mobilize support by

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[15] In the current literature, social support in couples is also defined as dyadic coping (Bodenmann, 2005). We thus include both lines of research to illuminate our research questions in the current article.

[16] The STM defines support mobilization as a stress communication process between partners. Although we built our research on the definition of stress communication postulated by the STM, yet we still made use of the term of support mobilization in the following text.

sharing stressors and soliciting support from the provider (Bodenmann, 2005; Schoebi, Wang, Ababkov, & Perrez, 2010; Wang, Shih, Hu, Louie, & Lau, 2010). Of note, support mobilization is culture-specific: which person can be asked for support (e.g., partners, friends, and relatives) in which situation (e.g., social, health, academic; Taylor et al., 2004; Kim et al., 2008). Several studies argue that Asians and Asian Americans mobilize less support from close others in comparison with Americans (Kim et al., 2008; Kim, et al., 2006; Mojaverian & Kim, 2013; Taylor et al., 2004, 2007; Wang et al., 2010)[17]. Finally, the *effects of support mobilization* on the seeker and the provider in couples remains unknown regardless of cultural contexts.

Further, a recent study argues that the stress-coping process in couples should be conceptually and statistically disaggregated into between-and within-person components (authors, under review). *Between-person* components capture trait-like components (e.g., partners' averaged coping behaviors), comparing time-invariant and situation-unspecific differences across individuals. *Within-person* components capture state-like components (e.g., daily fluctuations of partners' supportive behavior; Beggs, Holtzman, & DeLongis, 2016), allowing us to compare days when individuals mobilize more support in comparison with days when they mobilize less support. Thus, based on the findings focusing on the effects of partners' supportive behavior on the seeker (e.g., authors, under review; Beggs et al., 2016; Falconier et al., 2015) as well as studies arguing for the disaggregation of these two components (Curran & Bauer, 2011; Hoffman & Stawski, 2009), it is reasonable to assume that support mobilization in couples should be examined at both levels as well.

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[17] Such cultural differences are ascribed to the cultural contexts in which Asians and Americans live. In general, individuals in individualistic cultures perceive themselves as independent; therefore, they take actions for their personal needs (Markus & Kitayama, 1991; Fiske, Kitayama, Markus, & Nisbett, 1998), whereas individuals in collectivistic cultures construe themselves as interdependent with the emphasis on the pursuit of group goals rather than personal needs (Kim & Markus, 1999; Oyserman, Coon, & Kemmelmeier, 2002). Although there is variability across Asian countries (e.g., China, Japan) in how much or often people mobilize support (Morling, Uchida, & Frentrup, 2015; Schoebi et al., 2010), Asians, in general, are considered to mobilize less support.

Support Mobilization at Between-and Within-Person Levels

Conceptually, we aim to disentangle support mobilization at between- and within-person levels for the short-and-long-term effects in Asian couples. At the *actor* level (how mobilizing support affects the support-seeker), we assume that individuals who mobilize more support in general from their partners are more satisfied with their relationship in the short- and long-term compared with individuals who mobilize less support under stressful situations (between-person). Furthermore, we expect that on days when people mobilize more support from their partners, they are more satisfied with their relationship compared with days when they mobilize less support (within-person). At the *partner* level (how the seeker's support mobilization affects the partner), we expect to find a negative effect on the support-provider's relationship satisfaction in the short- and long-term, as prior studies demonstrate that this behaviors disturbs close others (e.g., Kim et al., 2008). Second, given that previous studies show that individuals' average and trait-like behaviors may exert an additive or interactive influence on their daily and state-like behaviors (Hoffman & Stawski, 2009), we further assume that the daily association between support mobilization and relationship satisfaction is moderated by individuals' average support mobilization level. Finally, we expect *gender differences* based on the gender role in Asian couples. Women are traditionally considered to be more responsible for providing support to men in collectivistic cultures because men are supposed to shoulder more family burden (i.e., Oysermam et al., 2002; Quek, Knudson-Martin, Rue, & Alabido, 2010; Xu & Hiew, 2016). In addition, Kim and colleagues (2008) reported that Asian women mobilized support more often than Asian men. Thus, we assume that all the aforementioned actor and partner effects would be stronger for women at both between-and within-person levels in the short- and long-term.

Current Study

As discussed above, between-and within-person components capture differential

effects of support mobilization on relationship outcomes. To examine these effects, we recruited dual-earner Chinese couples with at least one child younger than 5 years of age, who are considered to experience daily stress (Choi, 2008; Quek & Knudson-Martin, 2006; Xu & Hiew, 2016; Zhang, Foley, & Yang, 2013). Couples completed diaries every evening for 7 consecutive days about daily stress, support mobilization, and relationship satisfaction. Meanwhile, to examine the long-term effects, all of these couples reported their overall relationship satisfaction before the daily diary study and one year later. The Chinese population comprises the largest ethnic group in Asia and has been identified as the most collectivistic group among Asian countries (Osyermam et al., 2002; Quek, et al., 2010). The daily diary permits us to disaggregate between- and within-person components (Bolger & Laurenceau, 2013)[18]. Therefore, the current study was designed to integrate these two levels of analysis to test two sets of hypotheses.

Hypothesis 1: In testing *actor* effects, we first hypothesized that men and women's support mobilization was positively associated with their own relationship satisfaction at between-and within-person levels in the short-and long-term. Second, we predicted that men and women's support mobilization at the between-person level would moderate the within-person association between their own support mobilization and relationship satisfaction. Finally, as previous studies show that Chinese women mobilize support more often than Chinese men (Xu, Hilpert, Randall, Li, & Bodenmann, 2016), we expected that all the hypothesized effects were stronger for women.

Hypothesis 2: In testing *partner* effects, we first hypothesized that the seeker's support mobilization was negatively associated with the provider's relationship satisfaction at between-and within-person levels in the short-and long-term. Second, we predicted that the

[18] Of note, two studies used the daily diary design in examining Asians' support mobilization behaviors (for details see Schoebi et al., 2010; Wang et al., 2010) and expanded the knowledge of real-life interactions, but those studies did not test how support mobilization would affect the provider (e.g., partners).

seeker's support mobilization at the between-person level would moderate the within-person link between the seeker's support mobilization and the provider's relationship satisfaction. Likewise, we expected that all the hypothesized effects were stronger for women.

Method

Participants

Heterosexual couples were recruited in metropolitan cities in China (e.g., Beijing, Shanghai, Guangzhou and Shenzhen) by distributing flyers at parents' meetings in schools and to administrative managers of different enterprises (civil institutions, companies, schools and hospitals). Interested couples were screened by research assistants to determine if they met the following inclusion criteria: being married, living together with a partner, having at least one child under the age of five, and working full time (around 85% of Chinese couples are dual-earners, Zhang et al., 2013). Approximately 100 couples were interested in our study and were informed about aims of the study. All participants were notified that their data would be anonymized and kept confidential and that they could discontinue the study at any time. The final sample included 84 couples (N = 168) who were given written consent. Every couple was compensated with 100 CNY ($17 in 2014). The study was approved by the ethical commission at the university of ###.

On average, women were 31.2 years old (range: 24 - 45; SD = 3.4) and had a mean education level of 14 years (SD = 2.3) whereas men were 33.3 years old (range: 27 - 49; SD = 3.5) and had a mean education level of 16 years (SD = 3.1). Sixty-four percent of women reported to work in state-owned institutions (e.g., schools, hospitals, governments), 33 % reported to work in private companies and 3 % were self-employed, whereas 60% of men worked in state-owned institutions, 31% worked in private companies and 9% were self-employed. The average monthly salary for women and men were similar around 6000 CNY

to 10000 CNY (around $1000 - $1700). On average, couples were married for 6.3 years (*SD* = 4.0) and had 1.3 children (*SD* = .51).

Procedure

First, all participants received a survey to assess socio-demographics and were asked about their current overall relationship satisfaction. After we received the demographics, couples could choose from two options to participate: using a paper-pencil version or an e-version (sent by daily email). Sixty couples chose the paper-pencil version and received 7 diaries, 7 envelopes, and 7 pre-stamped envelopes for each participant. They were instructed to start on a Monday, fill out the dairy before going to sleep, and send it back to the research assistants next day. Twenty-four couples chose the e-version. Starting on a Monday, couples received an email with the attached diary and sent back the diary by mail before they went to bed across the week. All couples were asked about their overall relationship satisfaction one year later.

Measures

Daily support mobilization. To assess the support mobilization behavior, we adapted two items from the validated Chinese version of the stress communication subscale of the Dyadic Coping Inventory (DCI; Xu et al., 2016). Each participant rated their behaviors on a 7-point Likert-type scale (1 = *not at all today* to 7 = *extremely*, e.g., "I told my partner that I would appreciate his/her practical support, advice, or help today"). Reliabilities of change across dyadic coping items were moderate for within persons (men: R_C = .70; women: R_C = .72) and high for between persons across the 7 (K) fixed (F) days (men: R_{KF} = .79; women: R_{KF} = .81; Cranford, 2006).

Daily stressful situations. The support mobilization process is closely related to contingencies of daily stressors (Randall & Bodenmann, 2009). Thus, we need to include a count of all couples' daily stress in the model as a control variable and we adapted items from

the Multidimensional Stress Questionnaire for couples (MSQ-C, Bodenmann, Ledermann, & Bradbury, 2007). Spouses were asked about stress in five external domains: (a) social contacts (e.g., conflicts with colleagues); (b) children (e.g., child care); (c) financial issues (e.g., housing loan); (d) daily hassles (e.g., waiting lines, traffic jams); (e) job (e.g., workload, career opportunities). For each domain, they were instructed to rate the intensity of stress on a 7-point scale (1 = *not at all today* to 7 = *extremely*). The Chinese version was edited through the translation and back-translation procedure involving two bilingual social psychologists. A composite score was computed for each spouse by summing the 5 items. Internal consistency cannot necessarily be assumed across different domains of stress. Accordingly, the reliabilities of the different stress items were low for within persons (men: R_C = .34; women: R_C = .35) and between persons across the 7 (K) fixed (F) days (men: R_{KF} = .58; women: R_{KF} = .55; Cranford, 2006).

Daily relationship satisfaction. We adapted two items from the Chinese version of Relationship Assessment Scale (RAS; Wang et al., 2011) to assess today's level of relationship satisfaction (e.g., "How satisfied are you with your relationship today"). Couples responded to the two items on a 7-point Likert-type scales (1 = *totally unsatisfied* to 7 = *extremely satisfied*). A summed composite score was created for each spouse for each day. Reliabilities of change across relationship satisfaction items were high for both within persons (men: R_C = .81; women: R_C = .81) and between persons across the 7 (K) fixed (F) days (men: R_{KF} = .89; women: R_{KF} = .89; Cranford, 2006).

Overall relationship satisfaction. The 7-item inventory of Relationship Assessment Scale (RAS) has been commonly used to measure couples' overall relationship satisfaction on a 5-point Likert-type scale (e.g., "In general, how satisfied are you with your relationship"). The Chinese version of the RAS (Wang et al., 2011) has a good reliability (α

= .80) for both genders. In the current study, the internal consistency was α = .88 for men and α = .92 for women before the daily study and after one year.

Statistical Analyses

The main aim of the study was to examine the effects of support mobilization in the short-and long-term. In testing the day-to-day effects, we used multilevel modeling to analyze the nested daily diary data (Bolger & Laurenceau, 2013). A two-intercept model for male and female was computed. To test these two levels of effect, we disaggregated between- and within-person components of stress (control variable) and support mobilization: a weekly mean level of stress and support mobilization and the daily fluctuations around their weekly mean of stress and support mobilization for male and female respectively. Further, we included a dummy coded variable of time (weekdays = 0; weekend = 1) to control for a potential weekday or weekend effect. We followed Zuur and colleagues' suggestions (Zuur, Ieno, Walker, Saveliev, & Smith, 2009) about testing the random structure of the multilevel model: we compared models including all fixed effects and included one random effect at a time. Likelihood ratio tests reveal that a model allowing for random intercepts and random slopes for stress and support mobilization ($p < .001$) afforded the best model fit.

To test the long-term effects of support mobilization at between-and within-person levels on changes in relationship satisfaction, an actor-partner interdependence model was used (APIM; Cook & Kenny, 2005). We first computed a change score of relationship satisfaction from the beginning of the daily diary study to one year later (ΔRAS). We used the between-person (weekly mean scores) and within-person components of support mobilization as predictors of ΔRAS. As an average within-person score across the week is not meaningful (i.e., it is zero by definition), the standard deviation was computed for the within-person component for each individual, indicating how much a person varies in support mobilization across the week. Accordingly, we regressed the two variables on men and

women's changes in relationship satisfaction. The model was developed in a stepwise procedure. We specified a saturated model with all variables and then compared the saturated model where paths were allowed to vary freely with a model where either actor or partner effects were constrained to be equal across genders, which also allows us to test gender differences. Given that the constrained model did not worsen the model fit relative to the unconstrained model, we maintained the parsimonious model.

The statistical software package R (R version 3.1, R Core Team) was used to compute all the study models. We used the lme4 package (Bates, Maechler, Bolker, & Walker, 2015) for the multilevel model. We used the lavaan package (Rosseel, 2012) for the APIM to predict the long-term effects. Common fit indices were used to judge the APIM model fit: chi-square (χ^2), root mean square error of approximation (RMSEA smaller than .05), comparative fit index (CFI above .95) and standardized root mean squared residual (SRMR smaller than.08; Marsh, Hau, & Wen, 2004).

Results

Preliminary Analyses

As we collected information from 84 couples, each comprised of 2 persons, each assessed across 7 days, the data set is consisted of 1,176 observations. The response rate was high (missing data <0.5%). Means, standard deviations and intercorrelations are reported in Table 16. Overall, couples' reported daily stressful situations, support mobilization as well as daily and global relationship satisfaction was also medium to high. Intercorrelation analyses at the between-person level show that daily support mobilization was significantly related to daily stress, daily relationship satisfaction and global relationship satisfaction. At the within-person level, daily support mobilization was only correlated with daily variables and all the correlation coefficients were lower, indicating between-and within-person effects may differ.

Results of intraclass correlation analysis reveal that the associations among the

studied daily variables need to be examined at between-and within-person levels. The intraclass correlations of support mobilization (between: men = .48; women = .45; within: men = .52; women = .55) and relationship satisfaction (between: men = .48; women = .47; within: men = .52; women = .53) show that we found variances for both between-and within-persons processes. As for the control variable of stress, more variance of stress was found for within persons rather than between persons (within: men = .65; women = .70; between: men = .35; women = .30), suggesting that couples can be more influenced by everyday stress.

Table 16

Descriptive Statistics and Between-and Within-Person Correlation Analyses for All Studied Variables

	Descriptive				Between-person correlation					Within-person correlation				
	Men		Women		Variables					Variables				
Variables	Mean	*SD*	Mean	*SD*	1	2	3	4	5	1	2	3	4	5
Daily stressful situations	3.05	1.23	3.05	1.27	-	**.22**	**-.18**	**.18**	**.02**	-	**.12**	.03	.00	.00
Daily support mobilization	3.31	1.71	3.46	1.64	**.37**	-	**.22**	**.23**	**.03**	**.26**	-	**.11**	.00	.00
Daily relationship satisfaction	4.85	1.28	4.66	1.30	**-.14**	.04	-	-.02	.03	**-.03**	**.10**	-	-.02	.03
Relationship satisfaction (T1)	3.68	.67	3.87	.58	**.00**	.07	**.11**	-	**.27**	.00	.00	**.11**	-	**.27**
Relationship satisfaction (T2)	3.97	.73	3.74	.81	**.12**	.24	**.18**	**.14**	-	.00	.00	**.18**	**.14**	-

Note: T1 represents the time period before couples filed out diaries while T2 represents the time period one year later. Correlations above the diagonal are for men and below the diagonal are for women. Significant correlations are in bold ($p < .05$; two-tailed).

Hypothesis 1: Actor Effects

Hypothesis 1 aimed to test the actor effects – how own support mobilization predicts own relationship satisfaction (see Table 17). Figure 3 shows the spaghetti plots of how support mobilization affects couples' relationship satisfaction under stressful situations. At the between-person level, partially supporting our hypothesis, we found that men' s support mobilization had no effect on their own relationship satisfaction while women' s support mobilization was positively associated with relationship satisfaction (β_{men} = .08; β_{women} = .40), indicating that on average women benefit from support mobilization whereas men do not. Results of Wald chi-square tests imply that effects were significantly stronger for women. At the within-person level, we found that on days of stress both spouses mobilized support which was positively associated with their relationship satisfaction (β_{men} = .40; β_{women} = .15), which is in line with our hypothesis. Contrary to the hypothesis for gender differences, no gender difference was found. In addition, we found for men that support mobilization at the between-person level moderated the daily linkage between support mobilization and relationship satisfaction. Figure 4 illustrates that although men are satisfied with their relationship on days of stress when they mobilize more support, yet this effect is validated only when they have a rather high level of support mobilization in general. In comparison, women's support mobilization is additive regardless of influences of average and trait-like behaviors or daily state-like behaviors.

Finally, we tested the long-term effects of support mobilization on couples' relationship satisfaction assessed one year later. The final constrained model did not worsen than the unconstrained model (χ^2 = 1.64, p = .44); therefore, we adopted the constrained model as the final model for the reason of parsimony (model fit: χ^2 = .21, CFI = 1.00, RMSEA = .00 [90% CI:.00,.22], SRMR = .02).

Table 17

T*he Multilevel Model Examining Associations between Support mobilization and Relationship Satisfaction under Stressful Situations*

		Actor effects					Partner effects				
					95% CI					95% CI	
Variables		estimate	*SE*	*p*-value	LL	UL	estimate	*SE*	*p*-value	LL	UL
Fixed effects (intercepts)											
Time	H	-.01	.09	.88	-.18	.15	-	-	-	-	-
Time	W	.03	.09	.74	-.13	.20	-	-	-	-	-
Intercept	H	**4.85**	.11	.00	4.65	5.06	-	-	-	-	-
Intercept	W	**4.61**	.10	.00	4.41	4.80	-	-	-	-	-
Fixed effects (slopes)											
Stress (Control variable)											
Between-person	H	-.17	.14	.23	-.44	.10	-.08	.12	.46	-.32	.15
Between-person	W	**-.27**	.11	.02	-.49	-.05	.06	.13	.65	-.19	.30
Within-person	H	-.11	.06	.07	-.23	.01	**.15**	.06	.02	.02	.27
Within-person	W	.04	.08	.63	-.11	.19	-.08	.06	.14	-.21	.03
Support mobilization											
Between-person	H	.08	.10	.42	-.11	.27	.05	.10	.58	-.13	.24
Between-person	W	**.40**	.09	.00	.22	.57	-.16	.09	.07	-.34	.01
Within-person	H	**.13**	.04	.00	.05	.22	.02	.04	.59	-.06	.11
Within-person	W	**.15**	.10	.00	.08	.22	.07	.04	.06	-.01	.15
Cross-level interactions											
BP(SM) *WP(SM)	H	**.09**	.04	.04	.01	.17	.05	.04	.19	-.02	.13
BP(SM) *WP(SM)	W	-.01	.03	.69	-.08	.06	.02	.04	.65	-.06	.09
Random effects											
Intercept	H	.74	.86	-	.70	1.01	-	-	-		
Intercept	W	.72	.85	-	.34	1.71	-	-	-		
Stress	H	.03	.17	-	-.44	.22	.02	.15	-	-.12	.20
Stress	W	.11	.34	-	-.61	.69	.03	.16	-	-.41	.25
Support mobilization	H	.04	.19	-	-.37	.74	.02	.14	-	-.68	.27
Support mobilization	W	.01	.08	-	-.05	.35	.02	.13	-	-.35	.19
Residual	-	.76	.87	-	.72	.99	-	-			

Note. CI = confidence interval; SE = standard error; LL = low limit; UL = upper limit; H = husband; W = wife; BP = between-person; WP = within-person; SM = support mobilization. Significant effects are in bold ($p < .05$; two-tailed).

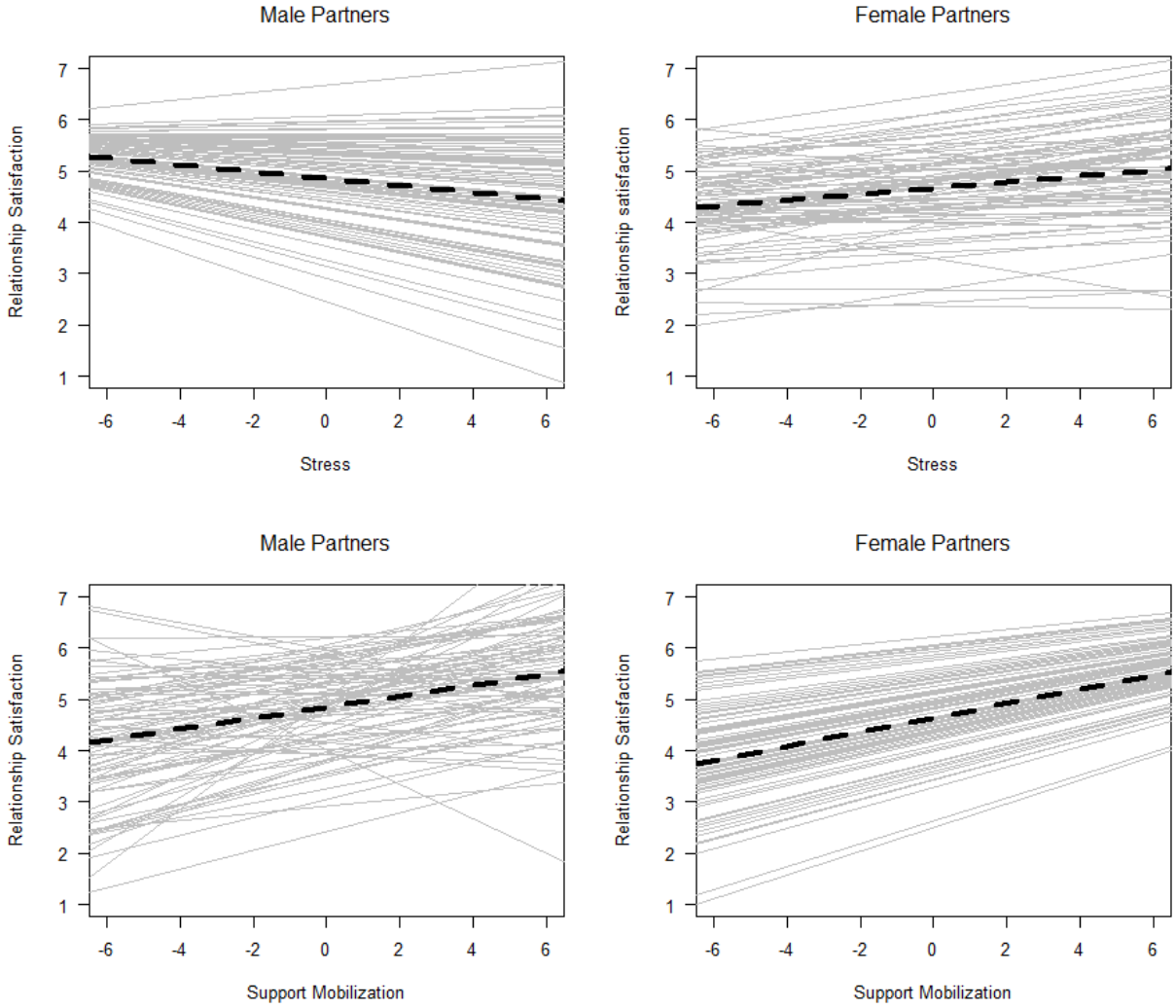

Figure 3. Spaghetti plots of the associations between stress/support mobilization and relationship satisfaction for actor effects.
Note. Solid gray lines represent estimated regression lines for each participant while dashed black lines represent the average regression lines. Stress and support mobilization (*x*-axes) are person mean centered.

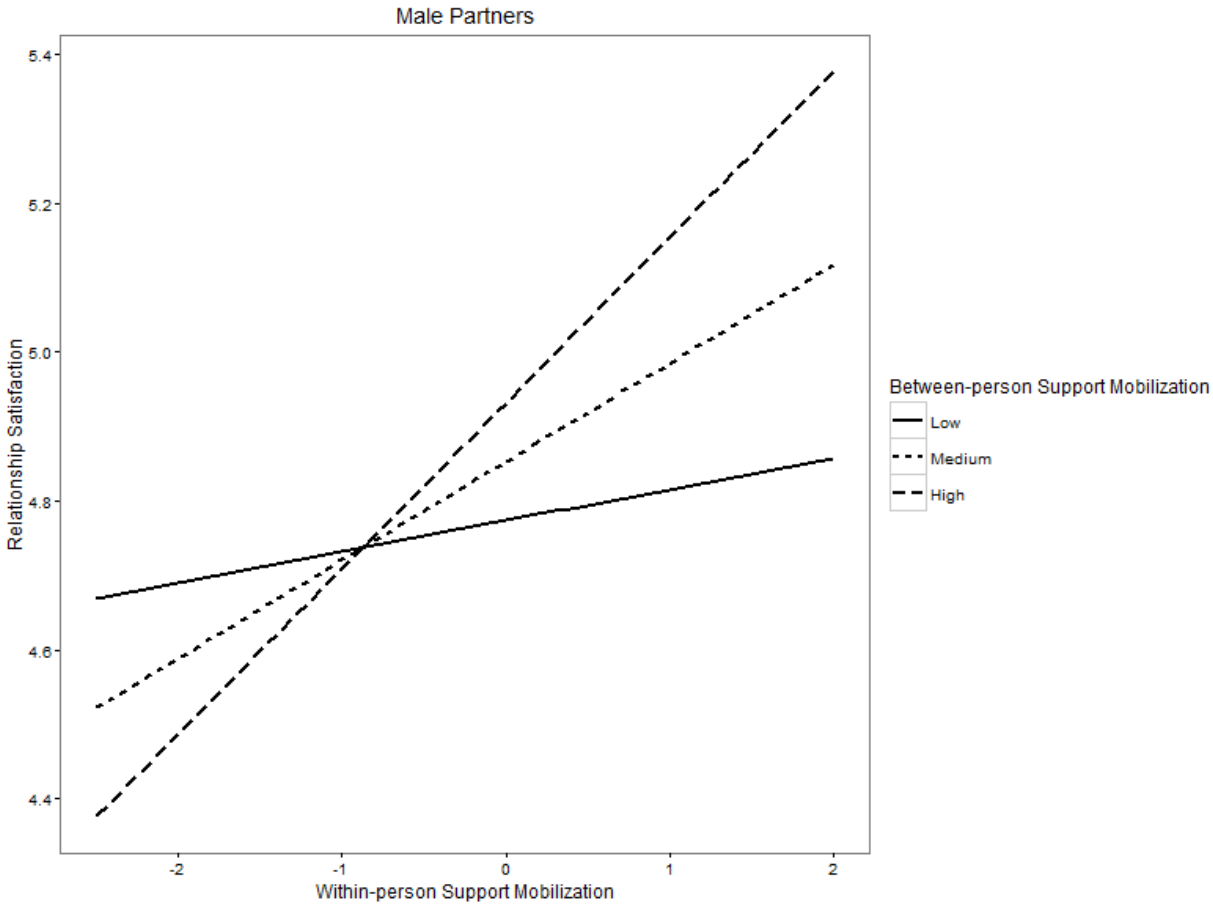

Figure 4. The cross-level interaction effect of the between-person support mobilization on the link between within-person support mobilization and relationship satisfaction for male partners

All the results are displayed in Table 18. Contrary to our hypotheses about the long-term actor effects, we did not find that support mobilization at the between-person level predicted relationship satisfaction in the long term, indicating that people who score even high in mobilizing support would not probably show a change in their relationship satisfaction longitudinally. However, at the within-person level, the results support the long-term effect of within-person fluctuations of daily support mobilization on couples' relationship satisfaction, indicating that the more a person fluctuates in support mobilization, the more positive change in relationship satisfaction would be found longitudinally. Moreover, no gender differences were found.

Hypothesis 2: Partner Effects

Hypothesis 2 aimed to test the partner effects – how the support-seeker's support mobilization predicts the support-provider's relationship satisfaction (see Table 17 and 18). In sharp contrast to prior findings and our hypotheses, no (negative) effects on the partner (the provider) were found neither on a daily basis nor in the long term at between- and within-person levels, suggesting that the seeker's support mobilization might not disturb the provider and negatively affect their relationship satisfaction. Meanwhile, we tested the cross-level interactions but failed in confirming any moderation effects. Finally, we found that there were no gender differences for all the short-and long-term partner effects.

Table 18
Long-term Consequences of Support Mobilization on Relationship Satisfaction

		Actor effects					Partner effects				
					95% CI					95% CI	
Modeling effects		estimate	*SE*	*p*	LL	UL	estimate	*SE*	*p*	LL	UL
SM-RS (between-person effects)	H	-.01	.06	.91	-.13	.12	.15	.09	.10	-.03	.34
SM-RS (between-person effects)	W	-.01	.06	.91	-.13	.12	-.11	.08	.15	-.27	.04
SM-RS (within-person effects)	H	**.38**	.14	.01	.11	.66	-.54	.22	.10	-.98	.10
SM-RS (within-person effects)	W	**.38**	.14	.01	.11	.66	.06	.17	.73	-.27	.39

Note. CI = confidence interval; SE = standard error; LL = low limit; UL = upper limit; H = husband; W = wife; SM = support mobilization; RS = relationship satisfaction. SM-RS and the likewise signs refer to the effects of support mobilization on couples' relationship satisfaction at time 2. Actor effects were set equal across gender. Significant effects are in bold ($p < .05$; two-tailed).

Discussion

Mobilizing support from the partner is a crucial strategy in times of stress. Although studies show that Asian mobilize less support from close other because they assume it burdens the relationship with close others, no study has examined the actual effect of support mobilization in couples over the short- and long-term. Results reveal that support mobilization was positive for the seeker but had no negative side effect for the partner.

The Effects of Support Mobilization on the Support-Seeker

At the between-person level, we found a gender difference which is of particular interest. Compared with women, men who reported mobilizing more support in general were not more satisfied with their relationship. One explanation for this gender difference is that in the traditional Chinese culture, women are in a submissive role and are supposed to provide support to their husbands without husbands' explicit request for support (Chen & Li, 2007; Quek et al., 2010; Xu & Hiew, 2016); therefore, husbands' general level of support mobilization might have no additional effect on their relationship satisfaction. On the other side, men are traditionally in a more dominant role and are less supposed to provide support and it is thus culturally less common for women to mobilize support. Nevertheless, nowadays women's stress level is high as they work full time and shoulder family burdens (Choi, 2008; Zhang et al., 2013; Xu et al., 2016). In this situation, mobilizing support from their spouses seems to exert a positive effect on women's relationship satisfaction. These findings were in contrast to a prior cross-sectional study reporting that support mobilization for both Chinese men and women was a robust predictor of their relationship satisfaction (Xu & Hiew, 2016). One alternative explanation for the inconsistencies in the findings is accounts of the analytical approach: between- and within-person components are mixed in cross-sectional data which influences the results (Hamaker, 2012).

Second, we tested for within-person effects and found that men and women were more satisfied with their relationship on days when they mobilized more support. Although we found a gender difference at the between-person level which seems to be culture-specific, yet the findings at the within-person level highlight that the mechanism of support mobilization was identical for men and women when examining processes occurring within persons over time. Even if Chinese men cannot benefit from mobilizing support at the between-person level, yet analyses at the within-person level prove that shows that Chinese couples varied in mobilizing support on high stressful days compared with low stressful days. In comparison with prior studies, our study advocates the advantage of separating between- and within-person components. Stress reactivity and support mobilization should occur within individuals over time and are considered as time-varying (Almeida, 2005; Bodenmann, 2005). Thus, it is imperative to provide insights into how within-person fluctuations of support mobilizations affect people in relationships. Our study is in line with some other studies examining aspects of supportive transactions in couples. For example, a study in the context of couples coping with illness demonstrates that higher levels of spouses' positive responses were associated with increased satisfaction for the patient across days (Beggs et al., 2016). Accordingly, it is reasonable to conclude that fluctuations of support mobilization are positively associated with Chinese couples' relationship satisfaction on days of need. Within-person mechanisms of support mobilization also deserve examination and replication in Western couples.

We further found that the association between day-to-day support mobilization and relationship satisfaction is moderated by the general support mobilization level for men but not for women. For women, the effects of support mobilization at between- and within-person levels determine their levels of satisfaction with the relationship, but both levels affect relationship independently of each other (i.e., additive effect, Hoffman & Stawski, 2009).

Moreover, although we found for men that support mobilization at the between-person level had no significant effect on relationship satisfaction, results of the moderation effect show that on days when men mobilized more support, only those men who in general mobilized more support were more satisfied with their relationship. In stark comparison, men with lower general levels of support mobilization did not benefit regardless of whether they actually mobilized more support on days of need. This indicates that the general support mobilization level of men still matters. One explanation for this finding is that if in relationships where men are willing to mobilize support, both partners may have developed the skills to deal with men's need in a functional way which in turn allows men to benefit on days when they mobilize more support. In contrast, men who do not regularly mobilize support do not benefit on days when they mobilize support as partners have not developed the skills. Future studies should examine this mechanism in more details, as this is also important for implementing relationship education programs for couples (see Halford & Bodenmann, 2013). More research is further needed to examine what has to be culturally adapted in relationship education programs so as to be applied to the Chinese culture.

Finally, we examined the long-term effects of support mobilization at between- and within-person levels. Although results reveal no effects for the between-person level, we found that within-person fluctuations of support mobilization predicted relationship satisfaction one year later. We assume that within-person fluctuations in couples' behaviors imply that couples would mobilize support on days of need which then indicates adaptive situation-specific behaviors in couples. These findings provide strong evidence for the notion that micro-processes in couples have long-term effects on relationship outcomes.

The Effects of Support Mobilization on the Support-Provider

Based on prior findings, we hypothesized that support mobilization would negatively affect close others (i.e., partners). However, our results reveal that support mobilization had

no effects on the partner – no negative effects at between- and within-person levels neither on a day-to-day basis nor in the long-term. These results are contradictory to several prior findings examining the predictive effect of support mobilization on close others (e.g., Taylor et al., 2004; Kim et al., 2008). However, these prior studies assessed solely participants' perceptions about the effects of support mobilization on close others in hypothetical vignette situations. Although the subjective perceptions about negative consequences of support mobilization in Asians hamper them to mobilize support, our findings provide evidence that this perception did not occur as how it was perceived in the mind: an Asian partner is not negatively affected in real-life situations over short-and long-term. It is likely and plausible to predict that close others are willing to provide support to the stressed partners across daily stressful situations, especially on particularly stressful days. Future studies should examine if there is actually a gap between how Chinese person perceive the effect of support mobilization and how it effects the partner in reality. Such a gap would have consequences for relationship education programs.

The current study has several limitations. First, our participants have a higher education level than average Chinese persons and well-educated Chinese couples have a more balanced gender role so that they attach high importance to their own personal well-being (Xu & Hiew, 2016; Zhang et al., 2013), which might influence couples' support mobilization behaviors. Second, although our analyses were based on intensive longitudinal data, the between- and within-person associations were based on a correlational design which does not allow us to draw causal conclusions. Third, as we just tested one Asian group (Chinese couples), it is not possible to differentiate which effects are universal and which are cultural specific for other Asian ethnic groups. Finally, we suggest that future studies should examine both behaviors simultaneously – how support mobilization impacts the amount and quality of partners' supportive behavior. Conceptually, we assume that the way how a person mobilizes

support influences how the partner provides support, which in turn then impacts on the support-seeker. Examining these reciprocal processes would allow researchers to provide a nuanced understanding of the complex and dynamic stress-coping process in couples.

Conclusion

Our study provides substantial evidence that mobilizing support at between- and within-person levels leads to the positive effect on the support-seeker but no negative effect on the support-provider. Significantly, our findings stand in sharp contrast to the perception that support mobilization negatively impacts on close others (i.e., partners), indicating that there might be a gap between individuals' perceptions how their behaviors affect close others and how it actually exerts influence on close others in real-life across different situations over time.

11 Study 5 Do Stress and Support Interact to Predict Relationship Satisfaction? Differences in Between-Person and Within-Person Effects[19]

Abstract

Although stress-coping processes are based on trait-like and state-like components (e.g., chronic and situation-specific stress), prevailing theories failed to describe explicitly the stress-coping process for each of this two levels, hampering empirical investigation of this sort. This study extends current models and tests stress-coping processes on between- and within-person level. Eighty-four Chinese dual-earning couples (N = 168 individuals) participated in a weekly longitudinal study (n = 1176 observations). Between persons, multilevel modeling replicated that the link between stress and relationship outcomes is moderated by partner's support behavior. At the within-person level, gender differences emerged: men reported higher relationship satisfaction on days when their spouse provided more support irrespective of their stress level whereas women were most satisfied on days when they experienced higher levels of stress and higher levels of partner's support (amplification effect). These results show that extending current models provide new insights into the stress-coping process in couples.

Introduction

Compared to people who are less stressed, people who are more stressed report greater levels of relationship dissatisfaction, raising important questions about how social support might strengthen or weaken effects of stress on feelings of closeness (e.g., Bodenmann et al., 2015; Williamson et al., 2016; Randall & Bodenmann 2009; Story & Bradbury, 2004). *Between-person* effects like these support emerging theoretical frameworks linking stress to relationships (e.g., Bodenmann, 1995, 2005; Karney & Bradbury, 1995), yet they are not routinely distinguished from *within-person*, across-day covariations that also involve stress,

[19] This study is under review.

satisfaction, and support. Failing to make this distinction may result in an imprecise understanding of how stress affects relationships. For example, a person's relationship satisfaction may depend more upon whether the partner's today support provision covaries with today's stress level, and less upon the partner's average support provision or dyadic coping behavior[20] as it compares to that of other individuals. The current study examines associations between stress and relationship satisfaction at between-person and within-person levels, with particular emphasis on the moderating role of dyadic coping in these associations.

Stress and Coping in Intimate Relationships

Stress is common and costly for individuals (e.g., Thoits, 2010) and, for those individuals in a relationship, stress *spills over* to affect the partner and the relationship (e.g., Bodenmann, Ledermann, & Bradbury, 2007; Bolger, DeLongis, Kessler, & Schilling, 1989). Yet relationship partners are not passive participants in the stress spillover process, as the support one partner provides to a stressed mate is assumed to determine the extent to which stress affects the stressed individual and their relationship. Higher quality support covaries with better health, higher relationship satisfaction, and lower divorce rates (Bodenmann, Meuwly, & Kayser, 2011; Falconier, Jackson, Hilpert, & Bodenmann, 2015) and, following experimental induction of stress, partner's support offsets adverse effects of stress on cortisol fluctuations (Meuwly et al., 2012). In general, effective management of stress appears to be crucial in enabling couples to maintain their relationship.

As Curran and Bauer (2011) emphasize, however, broad assertions like this mask between-person and within-person forms of covariation. When considered at the *between-person* level, stress-coping processes primarily reflect relative stable, trait-like components, addressing whether individuals with higher average stress levels are less satisfied with their

[20] In the current paper, we focus on one aspect of dyadic coping, namely partner's supportive behavior in times of stress. The model we propose applies to theories and findings using terminology of social support as well as dyadic coping.

relationship in comparison with individuals with lower average stress levels, irrespective of time and situation (Almeida, 2005; Cohan & Bradbury, 1997). At the *within-person* level, state-like components of stress-coping processes are emphasized (e.g., Beggs, Holtzman, & DeLongis, 2016; Inauen, Shrout, Bolger, Stadler, & Scholz, 2016), providing information about how relationships are affected on days with more stress in comparison with days when they experience less stress. Analysis of within-person fluctuations enables couples to serve as their own controls across days, controlling for selection effects and personality traits, thus enabling more precise inferences about how fluctuations in stress and associated behavioral responses combine to predict relationship satisfaction (Almeida, 2005; Sears, Repetti, Reynolds, Robles, & Krull, 2016).

Prevailing models of stress and coping in couples often reference between- and within-person processes, but typically emphasize one at the expense of the other. For example, according to *stress spillover theory* (Bolger et al., 1989; Westman, 2001), "Spillover … is a within-person across-domains transmission of strain from one area of life to another" (Bakker, Westman, & Hetty van Emmerik, 2009, p. 207) but between-person processes are discounted. Along similar lines, the *Intimacy Process Model* (Reis & Shaver, 1988) underscores the importance of within-person contingencies in how partners perceive their mate's responses to specific disclosures, including disclosures about stress, but is largely silent on between-person influences. In the *Vulnerability-Stress-Adaptation Model* (VSA; Karney & Bradbury, 1995), support is presumed to be broadly adaptive in relationships because it can buffer the negative effects of stress, thus highlighting between-person differences but overlooking short-term within-person fluctuations in stress and partner's support responses to stress. The *Systemic-Transactional-Model* (STM; Bodenmann, 1995, 1997) was initially built upon the within-person idea that stress experienced by either partner triggers appraisal processes in both partners during an interaction, whereby partners evaluate

if they are able to cope with the stressor. However, the STM does not provide an explicit explanatory model of between-person (e.g., the effect of partner's average coping behavior) or within-person processes (e.g., partner's situation-specific coping behavior; Randall & Bodenmann, 2009), which stands in contrast to the fact that STM has mainly inspired empirical research on the between-persons level.

The failure of leading models to explicitly distinguish stress-coping processes on between- and within-person levels creates a variety of problems. First, although single-time measures tap state and trait variance (e.g., Hamaker, 2012), between-person effects are often misinterpreted operating on the within-person level (Brose et al., 2015). Second, between-person findings are often mistakenly used to justify intervening at the within-couple level. For example, interventions are typically predicated on basic evidence that couples with better communication skills experience higher levels of satisfaction, whereas the more critical question concerns whether changes in communication at the within-person level yield changes in satisfaction. Finally, conflating between- and within-person variance limits our ability to understand how they relate to one another. For example, only when the two perspectives are distinguished can we address whether higher average levels of stress moderate the effects of a stressful day on relationship quality, or whether within-couple linkages between one partner's stress and the mate's support account for unique variability in satisfaction beyond between-couple effects. Based on general models of intimacy process and specific models of stress spillover, we adopt the general view that within-person associations between the experience of stress and same-day perceptions of partner's support do capture unique predictive variance, and we test this view in relation to between-couple indices of stress and support perceptions. Below we outline how current models of stress and coping in relationships might be extended by distinguishing between- and within-person sources of variance.

Between-Person and Within-Person Moderation of Stress-to-Satisfaction Effects:

Contributions of Perceptions of Dyadic Coping

While we generally expect that stress, regardless of whether it is assessed on the between-person level (i.e., a typical or model form of stress) or the within-person level (e.g., today's work stress), will be inversely associated with relationship satisfaction, evidence tends to be stronger for between-person than within-person effects of stress on dyadic processes (Bodenmann, Meuwly, Bradbury, Gmelch, & Ledermann, 2010; Buck & Neff, 2012; Williamson, Hanna, Lavner, Bradbury, & Karney, 2013). At the same time there is sufficient evidence to support the view that stress that exceeds one's own baseline can be consequential for relationship processes and outcomes (Bar-Kalifa & Rafaeli, 2015; Buck & Neff, 2012; Neff & Karney, 2009; Repetti, 1989; Story & Repetti, 2006), justifying simultaneous study and comparing of both levels of analysis. Thus, we assume the effect of today's stress on relationship outcomes depends on a person's general stress level.

Dyadic coping determines relationship outcomes via two mechanisms. There is an overall beneficial effect of partner's support, which has been defined as the *direct effect*, whereby partner support evokes positive emotions in the stressed person by feeling understood and cared for (Bodenmann, 1995; Cohen & Wills, 1985; Cutrona, 1996). The other mechanism is defined as the *buffer effect* of partner support when its provision protects the stressed person by reducing the negative effect of stress on the relationship (Cohen & Wills, 1985; Falconier, Nussbeck, & Bodenmann, 2013; Merz, Meuwly, Randall, & Bodenmann, 2014). As both mechanisms are crucial, we separately discuss them on the between- and the within-person level.

Conceptually, we assume that the partner's average support provision and the partner's support provision on any given day is positively associated with relationship outcomes, after controlling for stress. At the *between-person* level, findings show that partners who receive more support are more satisfied with their relationship (e.g., Belcher et

al., 2011; Berg et al., 2008; Bodenmann, Pihet, & Kayser, 2006; Falconier et al., 2015; Gleason, Iida, Shrout, & Bolger, 2008; Neff & Karney, 2005; Pasch & Bradbury, 1998). The few findings focusing on the *within-person* level use daily diary data to show that people report more intimacy (Belcher et al., 2011), closeness (Gleason et al., 2008), and better moods (Bar-Kalifa & Rafaeli, 2015) on days when they perceive more support from their partner.

To date, the theoretical and empirical literature are unclear on whether partner's support at the between-person level is stronger in magnitude than support at the within-person level in predicting relationship satisfaction. STM and VSA implicitly assume that the average behavior of the partner is key, as it shapes a person's general perspective about the relationship. However, we assume that people are susceptible to changes in partners' behavior and, therefore, dyadic coping at both levels might equally predict relationship satisfaction. At the same time, we assume that the effect of partner's today supportive behavior depends on the partner's general supportive behavior.

The *buffer effect* predicts that partner's dyadic coping behavior reduces the negative effect of stress on relationship outcomes (Cohen & Wills, 1985). VSA and STM assume that the buffer effect on the between-person level is crucial, as this is supposed to shape a person's perception of how much the partner cares in general, which in turn affects relationship outcomes. Results show that for people with higher levels of stress, those individuals are more satisfied with their relationship who in general receive more support from their partner in comparison with individuals who receive in general less support (e.g., Brock & Lawrence, 2008; DeLongis, Capreol, Holtzman, O'Brien, & Campbell, 2004; Falconier et al., 2015). Prevailing theories have not conceptualized a buffer effect on the *within-person* level, but this effect subsumes the essence of the stress-coping process: Partner's higher support provision buffers the negative effect of stress on days where a person experience higher level of stress than usual, which is also taught in relationship education programs (CCET; Bodenmann,

Hilpert, Nussbeck & Bradbury, 2014; Bodenmann & Shantinath, 2004). Thus, when stress and partner's support behavior covary, we predict that partner's support buffers the negative effect of stress on that particular day. In the long-term, we assume that this should shape the general perception about the relationship if the partner is there to provide support in times of need.

Current Study

Between-person and within-person effects appear to capture distinctly different aspects of how stress and dyadic coping combine to predict relationship satisfaction, yet these effects are not yet well-characterized within leading models of stress and relationship functioning. We aim to integrate these two lines of work by testing three sets of hypotheses: First, we hypothesize that stress will be inversely associated with relationship satisfaction between- and within-persons. Based on the assumption that typical or aggregated stress is more detrimental for relationships than scattered days of high stress, we predict that the magnitude of the between-person effects will be larger than the effects on the within-person level. In addition, we hypothesize that the negative linkage between today's stress and relationship satisfaction will be amplified by the average stress. Second, we hypothesize that dyadic coping will predict relationship satisfaction, between- and within-persons, even after controlling for stress. We predict similar effects of dyadic coping on the between- and within-person level. Furthermore, we assume that the positive link between partner's today support behavior and relationship satisfaction is reduced for those individuals who receive more support from their partner in general. With the last set of hypotheses, we predict that partner's support will moderate stress-satisfaction effects on between- and within-person levels.

To examine these effects, we asked both partners in a group of couples known to be at elevated levels of stress – dual-earner couples with at least one child (e.g., Quek & Knudson-

Martin, 2006) – to complete, at the end of each day for seven days, a daily diary about same-day stress experiences, partner's dyadic coping provision, and their level of satisfaction with the relationship. Daily diary data are ideal for disambiguating between-person differences and within-person fluctuations (Bolger & Laurenceau, 2013; Curran & Bauer, 2011; Hoffman & Stawski, 2009).

Because there is a recognized need to conduct research with diverse populations in general and diverse couples and families in particular (Falconier, Randall, & Bodenmann, 2016), we collected data from dual-earner parents living in mainland China. While it is reasonable to propose that culture may moderate stress-coping associations -- cultural expectations and values may influence when and how stressed couples seek for support, for example, and what kind of support they receive in return (e.g., Berg et al., 2008; Falconier, Randall, & Bodenmann, 2016) – available findings suggest that Chinese couples may be generally similar to the North American and European couples studied to date (Xu, Hilpert, Randall, Li, & Bodenmann, 2016). For example, workload and parenting demands covary with adverse relational and health outcomes among Chinese couples (e.g., Gao, Kao, & Ting-Toomey, 1998; Zhang, Foley, & Yang, 2013), Chinese partners support each other in times of stress (Chi et al., 2010; Li & Wickrama, 2014), and associations between partner support and relationship satisfaction are similar in Chinese and American relationships (Xu et al., 2016; authors, blinded). While we remain open to the possibility that the existing evidence may not provide a strong basis for testing hypotheses in a Chinese sample, couples under stress may evidence similar effects independent of culture, and available evidence does afford a useful starting point for examining stress and support in an understudied population.

Method

Participants

Heterosexual couples were recruited in four metropolitan cities in China (Beijing,

Shanghai, Guangzhou, and Shenzhen) by distributing flyers at parents' meetings in schools and to administrative managers of different enterprises (civil institutions, companies, schools, and hospitals). Approximately 100 couples expressed interest in the study and were screened by research assistants to determine if they met the following inclusion criteria: being married, living together with their partner, having at least one child, and both partners working full-time. All participants were notified that their data would be anonymized and kept confidential and that they could discontinue the study at any time without facing any problem. The 84 couples (N = 168) comprising the final sample gave written consent and were paid 100 CNY (~17 USD in 2014) upon completion of the study. The IRB at University of [blinded] approved all study procedures.

Women averaged 31.2 years of age (range: 24 - 45; *SD* = 3.4) and 14 years of education (*SD* = 2.3); men averaged 33.3 years of age (range: 27 - 49; *SD* = 3.5) and 16 years of education (*SD* = 3.1). All participants worked full time, as is common in China (Ling & Powell, 2011). Sixty-four percent of women reported to work in state-owned institutions (e.g., schools, hospitals, governments), 33% reported to work in private companies, and 3% were self-employed; comparable figures for men were 60%, 31%, and 9%. The average monthly salaries for women and for men ranged from 6000 CNY to 10000 CNY (~1000 USD to 1700 USD). Couples averaged 6.3 years of marriage (*SD* = 4.0) and 1.3 children (*SD* = .51).

Procedure

First, all participants received a survey to assess socio-demographics. After we received the survey, couples could choose from two options to participate: using a paper-pencil version or an e-version (sent by daily email). Sixty couples chose the paper-pencil version and received 7 diaries, 7 envelopes, and 7 pre-stamped envelopes for each participant. They were instructed to start on a Monday, fill out a diary before going to sleep, and send it back to the research assistants the next day. Twenty-four couples chose the e-version.

Starting on a Monday, couples received an email every day with the attached diary and return the diary the same evening.

Daily Diary Measures

Daily relationship satisfaction. We adapted two items from the Chinese version of Relationship Assessment Scale (Wang et al., 2011) to assess today's level of relationship satisfaction: *How satisfied are you with your relationship today? How contented are you with your relationship today?*. Couples responded to the two items on 7-point Likert-type scales (1 = *totally unsatisfied* to 7 = *extremely satisfied*). A summed composite score was created for each spouse for each day. Reliability of change across relationship satisfaction items were high within (men: R_C = .81; women: R_C = .81) and between participants across the 7 (K) fixed (F) days (men: R_{KF} = .89; women: R_{KF} = .89; Cranford, 2006).

Daily stressful life episodes. To assess daily stress, we adapted items from the external stress subscale of the Multidimensional Stress Questionnaire for couples (MSQ-C, Bodenmann et al., 2007). Whereas the original MSQ-C measures the frequency of acute stress across a week (and chronic stress across one year), the current daily measure was adapted to assess the intensity of today's stress. The reason for the adaptation is that most stressors do not occur more than once during the day and, therefore, assessing intensity is more meaningful than assessing frequency across a day. We followed back-translation procedure recommendations by Sireci and colleagues for MSQ-C (Sireci, Wang, Harter & Ehrlich, 2006). Every evening, spouses were asked to report about their daily stress levels in five domains: (a) social contacts (e.g., conflicts with colleagues, shillings); (b) children (e.g., child care, upbringing); (c) finance (e.g., housing loan, unexpected consumption); (d) daily hassles (e.g., losing, waiting lines, traffic jams); and (e) job (e.g., workload, career opportunities). For each domain, they were instructed to rate today's stress intensity on a 7-point scale (1 = *not at all* to 7 = *extremely*). A composite score was computed for each spouse

on every day by summing the 5 items. Internal consistency cannot necessarily be assumed across different domains of stress. Accordingly, the reliability of the different stress items was low within (men: R_C = .34; women: R_C = .35) and between participants across the 7 (K) fixed (F) days (men: R_{KF} = .58; women: R_{KF} = .55; Cranford, 2006).

Daily dyadic coping provided by the partner. We used two items from the validated Chinese version of the Dyadic Coping Inventory (DCI; Xu et al., 2016) to assess perceptions of the partner's emotional and instrumental support: Following the prompt, *What did your partner do today, when you were stressed?*, participants were asked: *My partner showed empathy and understanding towards me today* and *My partner helped me to analyze the situation so that I can better face the problem*. Each participant rated the partner's support behavior on 7-point Likert-type scales (1 = *not at all* to 7 = *extremely*). Reliability of change across dyadic coping items were moderate within (men: R_C = .69; women: R_C = .63) and high between participants across the 7 (K) fixed (F) days (men: R_{KF} = .81; women: R_{KF} = .81; Cranford, 2006).

Data Analysis Strategy

The main goal of the current study was to disentangle the stress-coping process in couples on between- and within-person level by focusing on three aspects of the process: the link between stress and relationship satisfaction and the effect of dyadic coping (main and buffer effect). Multilevel modeling was used to analyze the nested dyadic daily data (Bolger & Laurenceau, 2013; Raudenbush & Bryk, 2002). In order to test stress-coping processes on between- and within-person level, we separated stress as well as dyadic coping into between- and within-person components: a weekly mean level of stress ($stress_{between}$) and dyadic coping ($DC_{between}$) for men and women, respectively, and the daily fluctuations of stress and dyadic coping in relation to their weekly mean ($stress_{within}$; DC_{within}) for men and women, respectively, where *i* indexes individuals and *t* indexes days. In order to control for a possible

time effect (Bolger & Laurenceau, 2013), we included a time variable (starting day Monday = 0 to Sunday = 6). However, as the time effect was non-significant and did not improve model fit (p = .70), we removed this variable in our reported models (Zuur, Ieno, Walker, Saveliev, & Smith, 2009). Following Bolger and Laurenceau (2013), a double intercept model was used to account for interdependencies within couples. This enables us to examine fixed actor effect of both genders simultaneously but requires an analytical strategy that includes a dummy code for each gender (male, female) and to use interaction terms with these dummies to determine the respective effects.

To identify the optimal random structure, we further followed Zuur and colleagues' advice (Zuur et al., 2009) using a top-down approach: we sequentially compared models including all fixed effects and included one random effect at a time. Likelihood ratio tests revealed that a model allowing for random intercepts and random slopes for stress and for dyadic coping ($p < .001$) provided the best model fit. The equation for the baseline model without any interaction terms included is the following:

$$
\begin{aligned}
&\textit{Relationship satisfaction}_{it} = \\
&\quad (\text{male})_i\,[\beta_1\,(\textit{stress}_{\text{between}}) + \beta_2\,(\textit{stress}_{\text{within}}) + \beta_3\,(DC_{\text{between}}) + \beta_4\,(DC_{\text{within}}) + \\
&\qquad u_{m0i} + u_{m1i}\,(\textit{stress}_{\text{within}}) + u_{m2i}\,(DC_{\text{within}})] + \\
&\quad (\text{female})_i\,[\beta_5\,(\textit{stress}_{\text{between}}) + \beta_6\,(\textit{stress}_{\text{within}}) + \beta_7\,(DC_{\text{between}}) + \beta_8\,(DC_{\text{within}}) + \\
&\qquad u_{f0i} + u_{f1i}\,(\textit{stress}_{\text{within}}) + u_{f2i}\,(DC_{\text{within}})] \\
&\qquad + r_{it}
\end{aligned}
$$

In this double intercept model, male_i and female_i represent male's and female's intercept respectively. β_1 and β_5 capture stress on the between-person level and β_2 and β_6 represent stress on the within-person level. We used Wald chi-square tests for fixed effects to

compare if coefficients between genders are significantly different from each other. β_3 and β_7 indicate dyadic coping on the between-person level, whereas β_4 and β_8 capture dyadic coping on the within-person level; Wald chi-square tests were used to compare coefficients between genders. u_{m0i} and u_{f0i} represent the random intercepts, u_{m1i} and u_{f1i} indicate the random slope for stress, u_{m2i} and u_{f2i} stand for the random slope of dyadic coping, and r_{it} represents the residual for person *i* on day *t*.

To test our hypotheses regarding interaction effects, we used the baseline model described above and included the cross-level interaction terms ($DC_{between}$*DC_{within}), the between-person interaction terms ($stress_{between}$*$DC_{between}$), and the within-person interaction terms ($stress_{within}$*DC_{within}) for men and women, respectively. Model comparison showed that time (p = .70) and the cross-level interaction term for stress ($stress_{between}$*$stress_{within}$) did not contribute significantly to the model fit (p = .84) and were therefore removed from the final model that included the interaction terms.

We used the psych package (Revelle, 2015) for descriptive statistics, ggplot2 for graphs (Wickham, 2009), lme4 and lmerTest for multilevel modeling (Bates, Maechler, Bolker, & Walker, 2015; Brockhoff, 2015), and the car package for Wald chi-square tests (Fox & Weisberg, 2011) in R (R Core Team, 2014).

Results

Preliminary Analyses

As we collected information from 84 couples, each comprised of 2 persons, each assessed over 7 days, our data set consists of 1,176 observations. Response rate was high (missing data < 0.5%). Intraclass correlations revealed that approximately half of the variance in relationship satisfaction could be attributed to within-person variability across the 7 days (men: 53%; women: 52%) and the other half to the variability between-persons (men: 47%; women: 48%). Scatterplots of daily stress, dyadic coping, and relationship satisfaction

revealed no bi-variate outliers, ceiling effects, or time trends across the week. As the time variable and the cross-level interaction term for stress did not contribute to the model, these were excluded.

Table 19 presents descriptive statistics and between- and within-person correlations for both men and women. Stress levels and dyadic coping provision for men and women were medium to high (Stress: M_{men}= 3.05; M_{women}= 3.05, range = 1-7; Dyadic coping: M_{men}= 3.95; M_{women}= 3.89, range = 1-7) and reports of relationship satisfaction were high (M_{men}= 4.85; M_{women}= 4.66, range = 1-7). At the between-person level, bivariate correlations show reliable associations among all three variables, in expected directions. At the within-person level, correlations were lower, and associations between stress and relationship satisfaction were not significant, consistent with the idea that between- and within-subjects may differ. intraclass correlations show that about half of the variance occurs between persons and half within persons for dyadic coping and relationship satisfaction. Less variance was found for stress between persons but more within persons.

Table 19
Descriptive Statistics and Within-Person and Between-Person Correlations Among Study Variables Across 7 Days.

	Men		Women		Between-Person (n = 84)			Within-Person (n = 588)			Between-Person ICC	
	M	*SD*	*M*	*SD*	1	2	3	1	2	3	Men	Women
1 Stress	3.05	1.23	3.05	1.27		**.11**	**-.17**		**.10**	.03	.34	.29
2 Dyadic Coping	3.95	1.76	3.89	1.72	**.33**		**.32**	**.14**		**.15**	.45	.47
3 Relationship satisfaction	4.85	1.28	4.66	1.30	**-.14**	**.11**		-.05	**.08**		.47	.48

Note: All variables ranged from 1-7. Correlations above the diagonal are for women and under the diagonal are for men. ICC = intraclass correlation. Significant correlations are in bold ($p < .05$; two-tailed).

Main Effects of Stress and Dyadic Coping on Satisfaction

The baseline model allowed us to examine hypothesized main effects. First, we tested whether between- and within-person indices of stress were inversely associated with relationship satisfaction. On the between-person level, stress was negatively associated with relationship satisfaction (β_{men} = -.27, $p < .001$; β_{women} = -.24, $p = .001$) and on the within-person level results revealed a significant association for men (β_{men} = -.12, $p = .040$), replicating prior findings that stress has a detrimental impact on couples (Table 20). For women, however, stress was not associated with relationship satisfaction on the within-person level (β_{women} = .01, $p = .851$), indicating that more stress than usual on a specific day was not generally associated with less relationship satisfaction. Critically, however, inspection of the random slopes suggested the presence of a moderating effect: For half of the women, stress seemed to be negatively associated relationship satisfaction, whereas for the other half of women stress seemed to be positively associated with relationship satisfaction, canceling out any mean effect (Figure 5).

Next, we compared whether stress effects on satisfaction were stronger at the between-person level than the within-person level. For men, these effects did not differ, contrary to prediction. For women, stress on the between-person level yielded significantly stronger effects than did stress on the within-person level, yet we should interpret this finding with caution due to underlying moderating effects not captured in the baseline model.

Second, we hypothesized that perceptions of partner dyadic coping would covary with relationship satisfaction on between- and within-person levels, even after controlling for stress. As hypothesized, dyadic coping predicted relationship satisfaction on the between-person level (β_{men} = .42, $p = .008$; β_{women} = .51, $p < .001$) and the within-person level (β_{men} = .11, $p = .003$; β_{women} = .21, $p < .001$) for men and women. The between-person effect was stronger than the within-person effect for men, but these effects did not differ for women.

Table 20
Parameter Estimates for Multilevel Model of Relationship Satisfaction as a Function of Stress and Dyadic Coping.

Fixed effects					95% CI	
(intercepts, slopes)	Est	*SE*	*t*	*p*	LL	UL
Intercept_M	**4.68**	.14	34.00	< .001	4.40	4.97
Intercept_W	**4.53**	.12	37.71	< .001	4.28	4.77
Level 1 (within-person)						
Stress_M	**-.12**	.06	-2.07	.040	-0.24	-0.01
Stress_W	.01[a]	.06	0.19	.851	-0.11	0.13
DC_M	**.10**[b]	.04	2.28	.027	0.01	0.19
DC_W	**.22**	.04	5.13	< .001	0.14	0.30
Level 2 (between-person)						
Stress_M	**-.27**	.09	-2.28	< .001	-0.48	-0.08
Stress_W	**-.24**[a]	.07	-3.37	< .001	-0.38	-0.10
DC_M	**.28**[b]	.08	3.62	< .001	0.11	0.44
DC_W	**.36**	.07	5.49	< .001	0.22	0.50

Random effects					95% CI	
([co-]variances)	Est	*SE*			LL	UL
Level 1 (within-person)						
Residual	.78	.88	-	-	0.65	0.92
Level 2 (between-person)						
Intercept_M	.73	.85	-	-	0.72	0.96
Intercept_W	.60	.78	-	-	0.38	0.76
Stress_M	.03	.18	-	-	-0.13	0.87
Stress_W	.03	.17	-	-	-0.71	0.60
DC_M	.05	.22	-	-	-0.58	0.24
DC_W	.04	.19	-	-	-0.33	0.65

Note. Subscripts ([a], [b]) indicate significant differences between effect on the between- and within-person level; M = men; W = women; DC = dyadic coping; Est = unstandardized estimates; *SE* = standard error; CI = confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$; two-tailed).

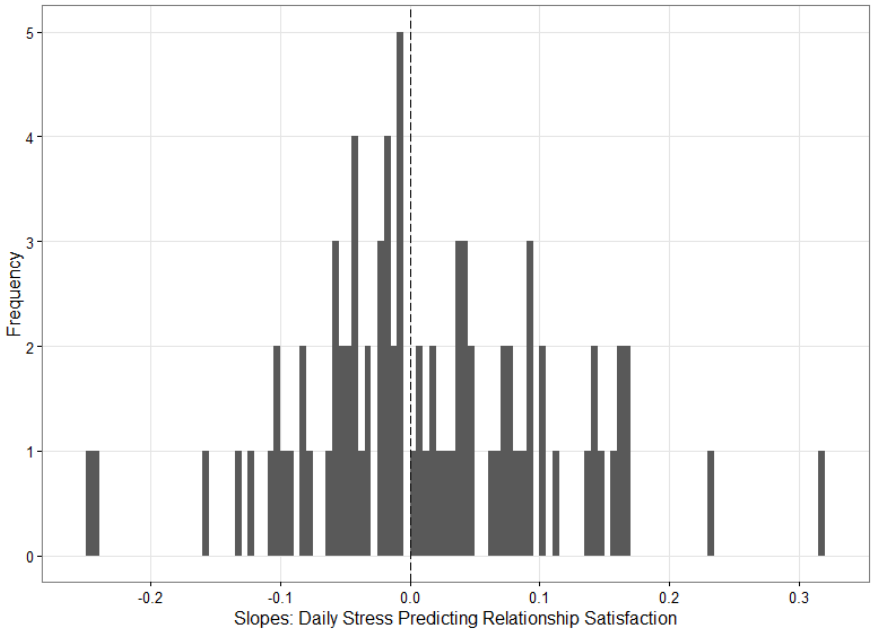

Figure 5. This figure illustrates random slope for women – how stress affects relationship satisfaction across the week. Negative slopes (left of the dotted line) indicate women for whom stress is negatively associated with relationship satisfaction, whereas positive slopes (right from the dotted line) indicates those women for whom stress was positively associated with relationship satisfaction.

Interaction Effects of Stress and Dyadic Coping

In the second model, we included interaction terms into the basic model. As mentioned, testing for optimal fixed-effect structure comparing model fits revealed that the cross-level interactions of stress for men and women ($stress_{between}$*$stress_{within}$) did not contribute to the model and were therefore excluded (see Table 21). This implies an additive effect: stress on the between- and with-person levels independently reduce relationship satisfaction.

Table 21
Parameter Estimates for Multilevel Model of Relationship Satisfaction as a Function of Stress and Dyadic Coping Including Interaction Terms.

Fixed effects					95% CI	
(intercepts, slopes)	Est	*SE*	*t*	*p*	LL	UL
Intercept_M	**4.64**	.13	34.00	< .001	4.38	4.91
Intercept_W	**4.55**	.12	38.29	< .001	4.32	4.79
Level 1 (within-person)						
Stress_M	**-.15**	.06	-2.51	.013	-0.27	-0.03
Stress_W	-.01	.07	-0.16	.875	-0.14	0.12
DC_M	**.15**	.05	3.14	.003	0.06	0.25
DC_W	**.22**	.04	4.88	< .001	0.13	0.31
Stress x DC_M	.08	.05	1.62	.106	-0.17	0.18
Stress x DC_W	**.13**	.06	2.09	.038	0.01	0.26
Level 2 (between-person)						
Stress_M	**-.24**	.09	-2.70	< .001	-0.42	-0.07
Stress_W	**-.21**	.07	-2.81	.006	-0.35	-0.06
DC_M	**.40**	.11	3.82	.008	0.20	0.61
DC_W	**.51**	.07	5.35	< .001	0.32	0.69
Stress x DC_M	**.14**	.06	2.24	.028	0.02	0.25
Stress x DC_W	**.12**	.06	2.12	.037	0.01	0.23
Cross-level interaction						
DC_M	**.09**	.04	2.03	.047	0.01	0.17
DC_W	.02	.04	0.54	.589	-0.06	0.10

Random effects					95% CI	
([co-]variances)	Est	*SE*			LL	UL
Level 1 (within-person)						
Residual	.77	.88	-	-	0.62	0.92
Level 2 (between-person)						
Intercept_M	.70	.82	-	-	0.68	0.97
Intercept_W	.57	.76	-	-	0.27	0.70
Stress_M	.03	.18	-	-	-0.02	0.92
Stress_W	.04	.20	-	-	-0.62	0.62
DC_M	.05	.23	-	-	-0.58	0.26
DC_W	.04	.20	-	-	-0.15	0.73

Note. M = men; W = women; DC = dyadic coping; Est = unstandardized estimates; *SE* = standard error; CI = confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$; two-tailed).

Results of the cross-level interactions of dyadic coping showed differential effects for gender (Table 20). We found a significant interaction effect for men (β_{men} = .09, p = .047). As shown in Figure 6, on days when men experience a higher level of support from their partner, those men are more satisfied who in general perceive more support from their partner, contradicting our hypothesis. For women, the two indices of dyadic coping did not interact, suggesting an additive effect instead; specifically, their relationship satisfaction on any given day appeared to be a reflection of that day's support behavior as well as the overall level of support they reported.

Finally, we tested whether perceptions of dyadic coping would offset the effects of stress on relationship satisfaction. On the between-person level, this buffering effect emerged for men and for women (β_{men} = .14, p = .028; β_{women} = .12, p = .037). As Figure 7 illustrates, for people with high average stress levels, those receiving more support on average are more satisfied with their relationship. On the within-person level, results for the interaction terms between stress and coping were nonsignificant for men but significant for women (β_{women} = .13, p = .038), but in an unexpected direction. Specifically, as shown in Figure 8 on stressful days when women received more support than usual from their spouses, they were more satisfied with their relationship as compared to days when they received a lot of support but were not actually stressed, implying an amplification effect rather than a buffer effect. In summary, these results revealed that within-person buffering effects differed from those at the between-person level.

Discussion

Managing stress is crucial for maintaining intimate relationships (Bodenmann, 1995; Neff & Karney, 2005), and while some prevailing theories recognize that stress and coping processes may take different forms at the between- and within-person levels (e.g., Bodenmann, 2005) , the processes on each level and interplay between these levels are not yet

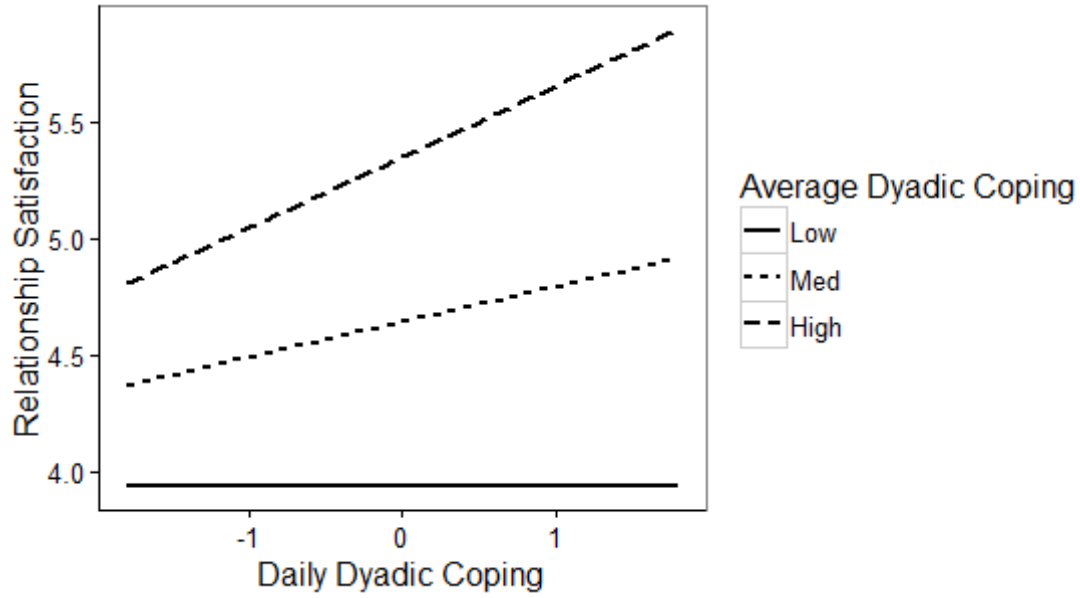

Figure 6. A significant cross-level interaction effect for men; the association between daily coping behavior and relationship satisfaction is moderated by partner's average coping behavior.

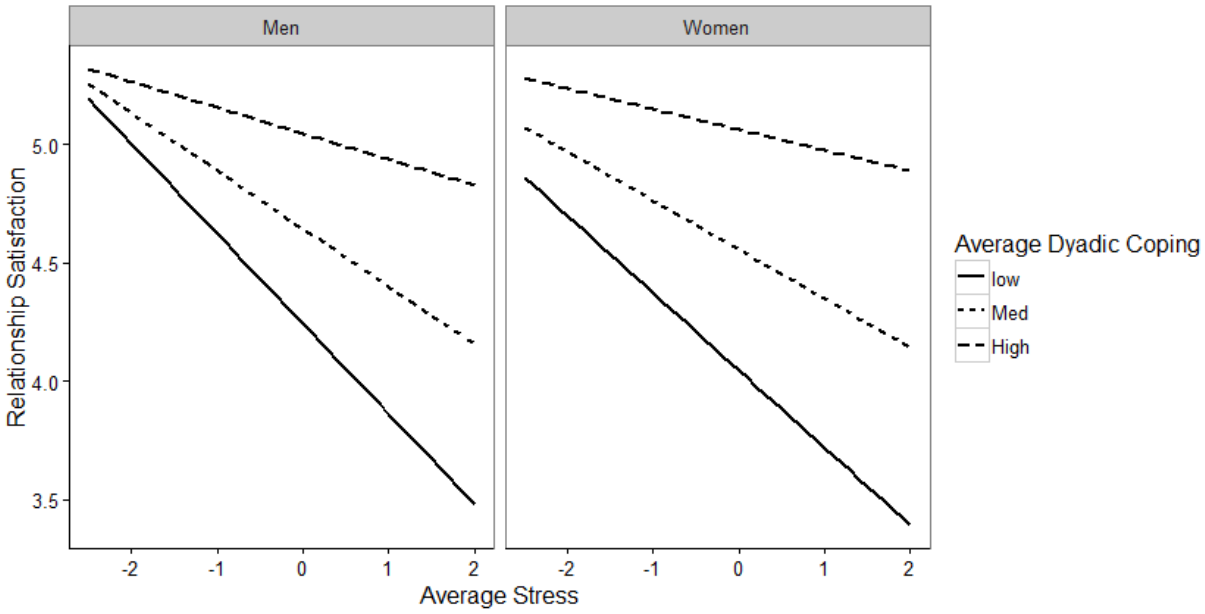

Figure 7. On the between-person level, perceptions of dyadic coping moderate the effects of stress on relationship satisfaction, for men and women. Specifically, at low levels of stress, satisfaction is high regardless of between-couple variability in dyadic coping, but at high levels of stress, satisfaction is especially low when dyadic coping exerts little dyadic coping the effects of high levels of his figures illustrate the buffer effects for men and women on the between-person level.

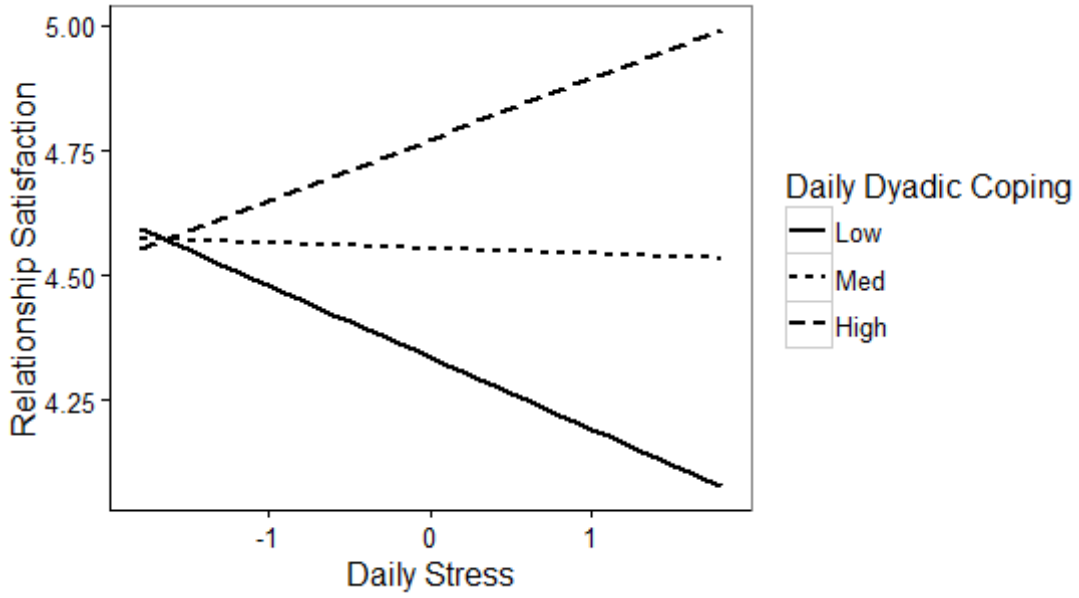

Figure 8. A significant interaction effect for women on the within-person level; the association between daily stress and relationship satisfaction is moderated by partner's daily coping behavior.

well articulated. Results revealed significant associations on the between- and within-person level as well as between the two levels. For example, we found a within-person moderation effect for women – that today's stress can be buffered by partner's today support provision. This idea is taught in relationship education programs (e.g., Couples Coping Enhancement Training; Bodenmann et al., 2014; Bodenmann & Shantinath, 2004) but it neither has been conceptualized explicitly nor has it been tested. Thus, our findings highlight that a conceptual and empirical disaggregation on between- and within-person level is fundamental to improve our understanding of the stress-coping process in couples.

Stress Spillover

On *between-person* level, our findings show that stress is negatively associated with relationship satisfaction, replicating prior findings on samples of Western couples (Hilpert, Bodenmann, Nussbeck, & Bradbury, 2013; Randall & Bodenmann, 2009; Story & Bradbury, 2004), indicating that the stress spillover process in Chinese dual earning couples is similar to the process in Western couples. On the *within-person* level, we found that relationship satisfaction decreases on days with more stress for all men and 50% of women, which is in

line with our assumption and providing evidence that stress on the within-person level is a crucial facet of the stress spillover process. For the other 50% of women, however, stress on the within-person level was positively associated with relationship satisfaction (Figure 1). Thus far, it is an open question why some women seem to feel more satisfied with their relationship on days where they experience more stress. On a physiological level, it has been shown that short-term stress can have a positive effect by activating immune response (Dhabar, 2014), but future research is needed to understand if this effect is universal or specific to Chinese women and what the cause this phenomenon for some women but not for others and whether this has a positive long-term effect on the relationship.

Comparing the effects of stress spilling over into relationships on the between- and within-person level, results revealed for women that the magnitude of the stress spillover effect on the between-person level was stronger in comparison with the effect on the within-person level. This indicates that the average stress level is a stronger predictor of relationship satisfaction than the situation-specific stress. But as mentioned, stress on the within-person level was negatively associated with relationship satisfaction for some women but positively associated with other women, resulting in a somehow misleading finding that stress on the within-person level has no impact on women across all women. This effect could be different for women where within-person stress is positive in comparison to those women for whom within-person stress is negative. For men, stress on the between- and within-person level was a significant predictor of relationship satisfaction, but no significant difference in their magnitude could be found. Finally, we hypothesized that the effect of today's stress is moderated by a person's average stress level; as higher the average stress level is for a specific person, as stronger we expected today's stress experience effects relationship outcomes. However, these findings indicate that stress on the between- and within-person level reduces relationship satisfaction independently of each other –an additive effect. In

summary, these findings show that the stress spillover process is similar for men and women on the between-person level, which is in line with prior findings (e.g., Hilpert et al., 2013), but reveals a first insight that the stress-coping process is different for gender on the within-person level.

Direct Effect of Dyadic Coping

On the between-person level, results revealed that dyadic coping predicts relationship satisfaction significantly for men and women, which is in line with theoretical assumptions (Bodenmann, 2005; Cutrona, 1996) and replicates prior findings based on Western samples (Bodenmann et al., 2006; Falconier et al., 2015). On the within-person level, dyadic coping behavior also predicted relationship satisfaction, supporting the few prior findings (Belcher et al., 2011; Gleason et al., 2008). Finding direct effects of dyadic coping on both levels informs us that current theories should be extended to describe more explicitly what partner's average coping behavior as well as partner's situation-specific coping behavior captures and how this can be used to advance our understanding of the coping process.

In addition, the direct effect of dyadic coping on the between-person level was stronger in magnitude for men than then impact on the within-person, but no difference could be found for women. Furthermore, we tested whether dyadic coping is interdependent predictors of relationship satisfaction on both levels and found a significant interaction for men. This indicates for women that dyadic coping on both levels have a similar effect in their magnitude on daily relationship satisfaction, but these effects are additive, they independently from each other affect relationship outcomes. For men, we found an unexpected interaction effect. Not only was the general behavior of the partner more predictive for their relationship satisfaction, but on days when their partner provided more support than they provide on average, only those men could benefit when the average level of partner's support was high. This contradicts our assumption for both genders that the effect of dyadic coping on the

within-person level is buffered in the environment of high levels of coping behavior but indicates an interesting amplification effect for men. In summary, these findings further highlight the importance to conceptualize coping and support processes on the between- and the within-person level in order to make new discoveries how trait- and state-like coping behaviors affect couples.

Buffer Effects of Dyadic Coping

Finally, we hypothesized buffer effects of the stress-coping process on the between- and the within-person level. On the between-person level, the negative effect of stress on relationship satisfaction was lower for those people who reported receiving more support from their partner in general in comparison with those people who have partners who provide less support in general. This finding is in line with prior findings (e.g., Brock & Lawrence, 2008; DeLongis, Capreol, Holtzman, O'Brien, & Campbell, 2004; Falconier et al., 2015). Furthermore, disaggregating between- and within-person effects allowed us to predict a buffer effect on the within-person level – if the partner provides more support on those days of more stress, this should buffer the negative impact of today's stress on the relationship. Results are unexpected and indicate further that gender differences mainly occur on the within-person level, whereas hardly any difference could be found on the trait-like aspects of the stress-coping process. For men, no moderation was found, undermining our expectation that more support on days of high stress should help men to cope with their stress. This contradicts the implicit assumption of STM and raises questions about how effective it is to teach women in relationship education programs to provide more support on days when their partner need it, if stress could not be buffered significantly. Another explanation could be that women should learn a different way to support their partner to reduce the negative effect of stress for their partners. For women, however, a significant within-person interaction was found - but Figure 4 revealed rather an amplification effect. If men provided more than average support on days

when women experience high levels of stress, it seemed to amplify women's satisfaction with the relationship; i.e., women were most happy when they experienced high levels of stress but also a high level of support. This would match STM assumptions that stress offers couples an opportunity to engage in mutual self-disclosure and that it may trigger personal encounters between partners, offering the possibility to experience that the partner is a reliable source of support when needed. Thus, the within-person effect might be more important in shaping women's general perspective of the relationship as it provides insight of how supportive the partner is and how effective the support is to buffer the stress.

Limitations

Before considering some theoretical implications of this work, several limitations should be mentioned. First, our sample is based on well-educated, middle-class heterosexual Chinese couples, which limits the generalizability of our results. Second and although couples were recruited from different major cities in China, the sample is small in comparison with such a large and diverse population like China. Third, it is also an open question whether these findings are universal of cultural specific. However, a recent study shows that the effect of dyadic coping on relationship satisfaction is very similar for American and Chinese couples in contrast with many other nations (authors, blinded). Fourth, the study is based on correlational data and causal conclusions cannot be drawn.

Theoretical Implications and Future Directions

Prevailing stress-coping theories inspired thousands of studies focusing on trait-like processes and a few studies examining state-like processes. The goal of the current study was to provide evidence that current theories should be extended to precisely and explicitly define stress-coping processes on the between- and within-person level. Our findings highlight that processes on both level matters, supporting the notion of stress researchers focusing on individuals (Lazarus, 2000; Tennen, Affleck, Armeli, & Carney, 2000). Furthermore,

evidence shows that gender differences occur mainly on the within-person level, indicating that when we compare processes between persons, women and men seem to react similarly to stress and coping – but when we compare them on their situation-specific reactions over time, they seem to experience the stress-coping process differently. Overall, these results demonstrate that current theories should be extended and include stress-coping process explicitly on the between- and within-person level. Extending this line of research will allow us to gain a better understanding of complex processes on both levels, which then can be implemented into stress prevention programs for couples. Thus the fact that education programs (e.g., Bodenmann, Hilpert, Nussbeck, & Bradbury, 2014; Bodenmann & Shantinath, 2004) teach couples to be more aware of partner's stress and to invest in dyadic coping in general (between-level) but particularly in times of need (within-level) is partially supported by our findings and suggests that future research should examine more rigorously stress-coping processes on the between- and within-person level for relationship education programs and long-term effects on couples.

12 General discussion and conclusions

The primary goals of the current thesis are concerned with two main aspects: (a) validating the Chinese version of the DCI and utilizing the STM to examine stress-coping processes in Chinese couples (between-person analyses); (b) further exploring stress communication (support mobilization), stress spillover and the direct and stress-buffering effects of supportive dyadic coping behaviors on Chinese couples based on the extended theoretical framework of the STM. In this part, the thesis would further summarize main findings, discuss some thought-provoking limitations and future directions as well as suggest implications for research and practice in accordance with results of all conducted studies.

12.1 Summary of findings

Study 1: In comparison with other validation studies, the validation study in Chinese language suggests two prominent results. First, as prior studies show discrepancies in the factorial structure of the DCI (5/2 vs. 4/1; e.g., Donato et al., 2009; Falconier et al., 2012; Randall et al., 2015), study 1 which utilized three cultures (China, Switzerland, and the U.S.) clarified the issue by establishing a common factorial structure for both Eastern and Western cultures and simultaneously confirming MI of the factorial structure across the three cultures. Meanwhile, we for the first time made use of MTMM to consolidate the dyadic nature of the construct validity of the DCI (Bodenmann, 2008). The validated version can be used for the cross-cultural examination. Second, based on the validated Chinese version of the DCI, we conducted latent means comparison in two groups (Chinese and Swiss; Chinese and the U.S.) for both genders. Results demonstrate that Chinese couples in general scored lower in all dyadic coping skills except for negative dyadic coping than Swiss and American couples. The general differences were still accounted for the fact that Chinese couples and Western couples are supposed to perceive negative or positive DC behaviors asymmetrically due to culturally different expectations (Ebrey, 2006; Osyerman et al., 2002). In all, the validation study

functions as a reliable preliminary study in examining Chinese couples' stress and dyadic coping processes.

Study 2: Utilizing the validated Chinese version of the DCI, Study 2 sought to apply the STM to provide an insight into the characteristics of dyadic coping in Chinese couples and the associations between dyadic coping skills and relationship satisfaction. First, we established gender differences for couples in three groups according to age, area and income level. For example, lower levels of many of the dyadic coping behaviors were reported by rural husbands and wives, and older wives. Husbands with higher incomes were less likely than husbands with lower incomes to do their partner's tasks or help her to see a problem from a different angle. In all, our administration of the DCI to Chinese couples revealed generational, regional, and socioeconomic group differences, which is in line with a study arguing that women and men can exhibit different behaviors across generations and regions in terms of traditional and equal gender values (Hu & Scott, 2014). Results indicate that there are variations in Chinese couples' dyadic coping processes, which further motivates us to examine behaviors transpiring within persons. Second, generally speaking, positive dyadic coping strategies were positively associated with Chinese couples' relationship satisfaction, especially for women. Of note, common dyadic coping explained more variance in relationship satisfaction than other skills (around .23). The results resonate a study who proposes that collective coping (similar to common dyadic coping, Falconier et al., 2016) is more important in collectivistic cultures due to the emphasis of interdependence between family members (Kuo, 2013). Study 2 yielded a general understanding of the application of the original STM to Chinese couples, which provides correlational evidence and lays foundation for studying mechanisms of stress-coping processes.

Study 3: Given that Study 2 only provides correlational evidence for dyadic coping in Chinese couples, Study 3 sought to provide evidence at the between-person level for

mechanisms underlying stress spillover and dyadic coping processes postulated by the STM. Replicating prior studies based on Western couples (Bodenmann et al., 2007; Hilpert et al., 2015; Ledermann et al., 2010), results reveal that internal stress severed as a strong mediator for the link between external stress and relationship satisfaction in Chinese couples. The results clearly indicate that external stressors Chinese couples may encounter can exacerbate couples' conflict interactions, which in turn impairs their relationship satisfaction. Couple clinicians should take into these considerations for providing counseling to Chinese couples about how they could deal with the conflict incurred by couples' own or common stressors. On the other hand, counter to the conceptualization of the stress-buffering effect of dyadic coping (e.g., Merz et al., 2014), we also found positive dyadic coping was a mediator for the link between external stress and relationship satisfaction in Chinese couples. It means that Chinese couples view dyadic coping as supportive resources in coping with stress. At least, results bear implications for practice. Confronted with stressors, clinicians should emphasize that couples are capable to engage in dyadic coping to reduce the stress level which might lead to conflict interactions. Finally, we did not find any gender differences in all the pathways, even if literature relative to the Chinese gender role suggests that men and women may differ in stress reactivity and coping efforts (see Chapter 4). The lack of gender differences may be accounts of the characteristics of our participants who are more of the well-educated and the middle class group. Such group is commonly considered to share a more equal gender role in facing to family and life burdens (Choi, 2008; Zhang et al., 2013) and therefore modern stressors enable both partners to seek assistance to maintain the homeostasis within their work and family domains.

Study 4: There is an apparent gap between how prior studies examined Asians' support mobilization behaviors (stress communication) and how Asians behave in their actual real-life interactions. Therefore, Study 4 tested how support mobilization affected the support-

seeker' relationship satisfaction (actor) and how the seeker' support mobilization in turn affected the support-provider' relationship satisfaction (partner) under real-life situations over short and long periods. For the actor effects, the most illuminative results are that both genders would mobilize support on days of stress which were in stark contrast to effects on the between-person level where we only confirmed effects for women. The most important explanation is that we disentangled between-and within-person effects to elucidate the differential influences on the support mobilization mechanisms that actually occur more often within individuals (Bodenmann, 2005; MacGeorge et al., 2011). This study also provides evidence for several studies arguing for the disaggregation of between-and within-person effects (Curran & Bauer, 2011; Hamaker, 2012; Hoffman & Stawski, 2009). Furthermore, the results also support the within-person change in couples' relationship satisfaction rather than the between-person change, which further consolidates the importance of integrating within-person effects. Short and long-term results for the actor effects inspire us to systematically investigate stable and trait-like components as well as state-like, situation-specific, and time-varying components in stress and coping processes.

Moreover, subsequent analyses of cross-level interaction effects indicate that the general level of men' support mobilization can determine how men would mobilize support on days of stress. These findings provide evidence for implementing relationship education programs in Chinese couples. Chinese men in general may not be used to mobilize support due to the influence of the traditional gender role (for details see Study 1 and 2), but if couples can work together to practice men' support mobilization skills, men can be more adroit in mobilizing support in general and across days over time. In this situation, couples' intimacy and relationship satisfaction would be greatly improved in times of stress.

In relation to the partner effects, greatly contradictory to previous studies, we did not establish any negative effects for the support-provider. Our study empirically extends a

conceptual cause-effect mechanism. Prior studies provide explanations on the basis of the support-seeker' perceptions: Asian and Asian American participants show a concern that mobilizing support would augment burden on the close others and undermine the relational harmony with them. We tested how support mobilization actually impacts the partner by modeling the effects of the seeker' behaviors on the provider' relationship satisfaction, revealing that there were no negative effects on the partner over short and long periods without gender differences. On the one hand, maintaining the relational harmony is culturally expected and even prioritized in Asians, which acts as code of conduct in real-life interactions for people (Huang & Grove, 2012; Xu & Hiew, 2016). On the other hand, as real-life interactions are always dynamic and changing, Asians would vary in practicing their cultural doctrines in their everyday life as a function of their need. Thus, we provide evidence that there are discrepancies and gaps between individuals' subjective values and the actual effects of support mobilization transactions on individuals or couples.

Another possible explanation is the fact that we focused on couples' relationship compared with other studies focusing on individuals. Previous studies have demonstrated that either Asians or Western couples would mobilize support from their intimate partners (see Falconier et al., 2016; Schoebi et al., 2010). It indicates that nowadays a spouse may be the most likely person form whom Asians would like to mobilize supportive transactions as collectivistic cultures favor interdependence between spouses in times of stress (Chen & Li, 2007; Xu & Hiew, 2016). We conclude that mobilizing support may not disturb Asians couples' sense of harmony across everyday stressful situations.

Study 5: Study 5, which was based on the same dataset as Study 4, was primarily conducted to further test Chinese couples' stress and dyadic coping mechanisms in real-life situations under the new framework of the STM. Acknowledging the between-and within-person components of stress-coping processes, the current study advanced our understanding

of how stress can spillover into Chinese couples' relationships and interact with supportive dyadic coping in predicting their relationship satisfaction in general and across daily stressful situations. For stress spillover effects, results show that stress had no effects on women at the within-person level which is quite different from other studies (e.g., Buck & Neff, 2012). However, viewing the plot (Figure 5), we found that it was only true for the half of women. Results were quite different from those of Study 3, which further entails that situational influences on reactivity are important for understanding the process of everyday stress. Although in general Chinese women are vulnerable to stressors, yet they tend to neglect the negative influence of stressors if their partners show empathy and understanding to them on a particular day.

For direct effects of dyadic coping, results were in consistent with Study 2 and Study 3 as partners' dyadic coping was positively associated with spouses' relationship satisfaction at the between-person level. Further, we extended the previous two studies by showing that it is the case at the within-person level. Somehow, these results further support the notion that dyadic coping is frequently utilized by dual-earner Chinese couples. With regards to stress-buffering effects of dyadic coping, results were contrary to those of Study 3 in that we established the moderating effects of supportive dyadic coping at both between-and within-person levels. Hamaker (2012) pointed out that cross-sectional studies mixed between-and within-person effects and interpreted between-person effects as within-person effects. This is also the issue for studies presented in this thesis. Results of studies with a large sample (Study 3) cannot be generalized into the phenomenon relative to stress-coping processes transpiring within individuals as suggested by the STM. Thus, we need to utilize data which are capable of capturing both between-and within-person mechanisms to prove or replicate previous established results. We propose that this matters regardless of cultural contexts. Meanwhile, current results also argue for the power and horizon of the extended STM, because we only

found the stress-buffering effect at the within-person level for women. It indicates that for Chinese women, they might need partners' support not only in general but also across daily situations. Thus, considering within-person and situation-specific aspects of stress-buffering effects for both genders expand the knowledge for implementing relationship education programs. Rather than teach skills to both genders in general, we need to reconsider questions about how effective it is to teach women to provide more support on days when their partners need it, if stress could not be buffered significantly.

12.2 Limitations and implications for future research

Given respective limitations have been thoroughly discussed in these five studies, several significant caveats relative to the extended STM and its application to empirical studies deserve further considerations. Three prominent issues covering sample and design, stress effects, dimensions of dyadic coping would be discussed and linked to future lines of research.

Sample and design. First, given the main theme of the thesis targeted at examining stress and dyadic coping processes in Chinese couples, the sample of current empirical studies based on the extended STM was quite limited in its characteristics. The 84 pairs of couples residing in mainly developed Chinese cities belong to the well-educated and middle-class group which is commonly considered to hold more modern values and ideas than other groups (e.g., Xu & Hiew, 2016). Thus, our findings cannot be overgeneralized into other couples group in China. Future studies should include diverse samples based on socio-demographics (similar to the sample in the first three studies based on the original model). Of note, it is expected that all the established mechanisms identified therein should be replicated in other clinical Chinese samples (e.g., distressed samples or samples who suffer severe stressors), which would be helpful for counseling or prevention services. Second, the thesis proposes that conceptually and statistically, between-and within-person components capture differential

effects of stress-coping processes suggested by the STM. Among all the strengths of self-reported data, intensive longitudinal data has the most power to allow researchers to approximate these two components and implement the relevant dyadic analyses (Bolger & Laurenceau, 2013). Nonetheless, it would be more accurate to use real-time ambulatory assessment (e.g., through mobile phones) to strengthen ecological validity and reduce retrospective recall bias. For instance, researchers can collect multiple points per day (morning to evening). In this way, we gain an insight into how often they encounter stressors (frequency) and engage in dyadic coping behaviors. Future research design might consider such methodology that affords more specificities to daily stress reactivity and coping behaviors. Third, as for the long-term effects, we only had one-year follow-up assessment (see Study 4) which might reduce the effect size. As long-term effects are essential components postulated by the STM, there is a need to collect data over more years to consolidate results of the within-person change which is a reliable longitudinal estimate of individuals' behavioral change over time than between-person change (Hoffman, 2015; Sliwinsiki et al., 2009). In addition, the long-term effects should be also examined in the stress-buffering effects, especially for the within-person moderation effect identified in Study 5. Previous studies have proved that partners' supportive dyadic coping can buffer partners' stress and improve their relationship satisfaction one year later (Merz et al., 2014). But results limited its scope in between-person change. Thus, additional research is needed to provide a unique demonstration of whether fluctuations in partners' dyadic coping over time might make partners feel satisfied in the long run.

Stress effects. The extended STM argues that couples' stress reactivity should be more accounts of influences of state-like determinants rather than just trait-like determinants. Our studies provide strong evidence that both average stressors as well as daily stressors are relevant for Chinese men and women' reactivity, which further supports negative influences

of *stress spillover* effects on couples' relationships from the perspective of situational or everyday stress (Bodenmann, 2005; Buck & Neff, 2012; Randall & Bodenmann, 2009). Nevertheless, we did not include *stress crossover* effects on couples' relationships in the extended model which is also a very important mechanism proposed by the STM (Falconier et al., 2016). Based on the STM, daily stressors one partner experiences can crossover to the intimate partner and become we-stressor (Bodenmann, 1995, 2005). If this is the case for couples across daily stressful situations, common dyadic coping should be extremely beneficial for couples' healthy relationships over time. Therefore, crucial to interpret this mechanism is also to capture differential effects of between-and within-person components for stress crossover effects, which in turn provides an alternative account of how stress can hinder couples' adaptive relationships. Future empirical studies are needed that offer a fine-grained picture of the negative effects of both stress spillover and crossover on couples' relationships. Moreover, couples residing in different countries are particularly vulnerable to specific stressors which are closely related to the environment. For example, as a majority of Chinese family is now defined as 4-2-1mode (parents-couples-child, Hesketh et al., 2005). Then, the intergeneration stress, elder-care and child-care included, might be a severe stressor for modern Chinese couples. Thus, future studies might provide more details about how specific stressful situations might impair their relationships beyond exploring stress pile-up effects in the current studies.

Dimensions of dyadic coping. There are two untapped issues relative to dimensions of dyadic coping in the proposed extended STM. On the one hand, in accordance with the STM (Bodenmann, 2005), dyadic coping is differentiated into problem-focused and emotion-focused forms. Although Study 1 has fully validated the DCI in the Chinese language, yet Study 4 and 5 did not distinguish problem-and emotion-focused stress communication and supportive dyadic coping behaviors. Previous cross-sectional studies reveal that Chinese or

Asians tend to use more emotion-focused supportive behaviors than Westerners (e.g., Burleson, 2003), especially for women. Regardless of its between-person evidence, cultural factors seem to still matter for the type of support needed and provided. It is worth noting that future studies based on between-and within-person analyses should differentiate these two forms to explore how Chinese couples utilize stress communication and dyadic coping skills. As for within-person components, such analysis would provide a more textured analysis of couples' emotional need or practical need on days of stress. It is possible that Chinese couples might have more need for problem-focused coping recourses on a particular stressful day than usual. On the other hand, the STM considers common dyadic coping as an essential component as supportive dyadic coping in stress-coping processes (Bodenmann, 2005), yet current empirical studies did not examine this process. As noted, Study 2 seems to prove that common dyadic coping explained more variance in Chinese couples' relationship satisfaction as it resonates with the idea of collective coping emphasized in collectivistic cultures (Kuo, 2013). Thus, future studies should explore such joint coping responses in Chinese couples at both between-and within-person levels. For example, Chinese couples value children as the most important motive for them in striving for life (Xu & Hiew, 2016) and thus parenting stress can elicit their common dyadic coping efforts in general or across all stressful situations over time. It might be the case for other shared life stressors (financial issues, household); therefore, we need to expand our knowledge about how trait-like and state-like components of common dyadic coping would be positively associated with couples' relationships or buffer stressors in additional empirical studies.

12.3 Practical and clinical implications

Our findings based on the five studies provide unique and meaningful practical and clinical implications for couple counselors, therapists and clinicians who work with Chinese couples as well as couples who are influenced by the Chinese culture. In particular, our

findings relative to within-person components might also give some thoughts for Western couple counselors, therapists and clinicians.

12.3.1 Practical issues

Because nowadays modern Chinese couples are facing a variety of stressors which can hinder their adaptive relationships, couples counselors and therapists are expected to identify stress and coping processes in them based on the cultural heritage and modern influences. First, the extent of negative impact of stressors and relevant dyadic coping behaviors should be assessed before the commencement of counseling and therapy service. This is especially important for dual-earner couples who have been long considered to suffer stressors. Second, given both Chinese husbands and wives are sensitive to external stressors and would feel less satisfied with their relationships when suffering stressors, it is important to make them understand stress spillover effects. To avoid conflict interactions incurred by external stressors, couples should fully realize the nature of external stressors and learn how to deal with stressors with mutual efforts. Of note, Chinese women are more vulnerable to external stressors than Chinese men. Nevertheless, according to within-person analyses, a number of Chinese men was negatively affected by daily stressors as well. Couples counselors remind women be aware of this point as men might need outlets for their stressors in daily life, otherwise conflict interactions would be easily activated thorough pile-up effects of everyday stressors (e.g., workload, financial issues, social contacts). When working with distressed couples who might be influenced by both external stressors and conflict interactions, therapists should lay special emphasis on stress spillover effects and differential effects of couples' reactivity in general and across daily life situations, which in turn might lessen the negative impact of stressors and avoid the occurrence of more severe conflict.

Third, previous empirical studies reveal that Asians or Chinese use less support seeking and prefer to implicit or indirect way of expressing themselves. Nevertheless, this

should be interpreted with caution in counseling and therapy service as our findings show that this is not the case in Chinese couples. Although understanding cultural norms is extremely helpful in providing counseling and therapy to customers, yet counselors and therapists may identify influences of daily situations on their general behaviors when exposed to stressors. As a consequence of the advancement of the modern China Chinese couples can not only vary in practicing cultural norms based on daily changing situations but also tend to be individualistic in reacting to stressors in modern society. Thus, counselors and therapists may encourage couples to disclose themselves in times of need, which in turn helps them to obtain coping resources. However, issues of maintaining harmony and the traditional gender role should also be taken into account. Because men traditionally expect women to detect their needs and are inclined to suppress their true needs even if on days of need, counselors and therapists may give advice for women, such as expressing themselves while taking care of their partners' needs. Meanwhile, customers are supposed to understand the reciprocal benefits of stress communication: communicating stressors with each other should be helpful in taking care of each other' needs or feelings.

Fourth, our studies provide substantial evidence that dyadic coping is positively associated with couples' relationship satisfaction and can buffer stress in general and across days. Therefore, counselors and therapists may inspire Chinese couples who suffer stressors to cultivate and thus apply dyadic coping strategies. On the one hand, encouraging couples' engagement in dyadic coping is a useful way to help couples enhance their sense of intimacy and closeness, which in turn contributes to maintain their long-term relationship satisfaction. On the other hand, counselors and therapists should also remind couples to provide more support to their partners on a particular stressful day. This would be more helpful for Chinese women. Even if men are not used to provide support or lack providing skills, they should be encouraged to show care and assistance on days when women suffer a great amount of stress

(e.g., parenting and work stress). In this case, women would positively appraise their relationships. However, women should also be cautious of men' need on days of stress. Men might not have no need for support on days of stress but they lack of or are not used to seek support. Thus, practitioners should help couples build their mutual supportive skills within the relationship, especially on days of need. As the current thesis also provides evidence for the positive effect of common dyadic coping, yet practitioners might attach importance to couples' mutual efforts in coping stressors and motivate them to recognize stressors as we-stressor. This is in line with the interdependent nature of couple or family prioritized in the traditional Chinese family culture.

12.3.2 Clinical issues

Since two decades, couple or family therapy has been practiced in China (Miller & Fang, 2012). Initially, the face-to-face therapeutic programs are based on Western approaches, such as the cognitive-behavioral therapy, structural family therapy and solution-oriented therapeutic programs. Studies provide evidence that all these programs are effective in reducing couples and family members' mental disorders, like anxiety, depression (Miller & Fang, 2012). However, there is a paucity of implementing relationship education programs in China which are especially useful for couples who are satisfied with their relationships on average but suffer stressors. Compared with therapeutic programs, Chinese or Asian couples would be more willing to accept "education" than "therapy" as they claim that "one is never too old to learn" (Huang, 2005). Relationship education programs such as Couple Coping Enhancement Training (CCET; Bodenmann & Shantinath, 2004) and Couple Commitment and Relationship Enhancement (Couple CARE; Halford et al., 2006) have been demonstrated to reduce marital distress and increase marital satisfaction in Western couples, and therefore may be beneficial for Chinese based on our findings.

However, when clinically applying these education programs to Chinese couples, clinicians and educators should rigorously adapt the form and content to fit the traditional culture and modern situations. First, as previous studies show that the dissemination problem of counseling and therapy programs still remains unsolved due to the face maintenance and high economic costs, this might be the same tough issue in implementing relationship education programs through workshops or face-to-face trainings. Notably, CCET and Couple CARE programs are flexible in the mode of delivery (e.g., on-line resources and self-directed DVD; Bodenmann et al., 2014; Halford & Bodenmann, 2013). Thus, clinicians should design self-directed programs to cater to couples' need, which in turn might attract a variety of couples as they become more and more aware of their healthy relationship. Second, all these programs are extremely effective in improving couples' communication, stress management (dyadic coping) and conflict resolution skills. Nonetheless, clinicians should still take into account the traditional Chinese culture which might still influence their communication and coping behaviors. One possible solution is to concurrently apply both the Western-driven program and the cultural-adapted program to couples in randomized clinic trails to make a more appropriate program. As for the cultural-adapted program, we still need to modify several parts related to the Chinese culture (e.g., family harmony, children priority). For example, in dealing with conflicts that are exacerbated by daily external stressors, clinicians should relate the conflict resolution part to family harmony and the whole welfare instead of just teaching them how to manage the conflicts. During the process, we set a mutual goal of solving conflicts directed at maintaining family harmony and encouraging couples to relate what they are arguing and quarrelling to the welfare of their children and parents. In this way, they are possible to realize the potential threat that their conflicts may impair their whole family clan. It is a good way to keep a balance between influences of traditional ideas and influences of modern values.

Third, as our findings demonstrate reliable effects on stress-coping processes at the within-person level. These results deserve careful consideration when implementing relationship education programs in Chinese couples. Because programs are directed at improving couples' relationship-promoting skills (stress management, positive communication and conflict resolution) in general, clinicians and educators should contemplate whether couples need such skills every day or need these more in times of need (e.g., on a particular stressful or confrontational day). These thoughts might be extremely useful for Chinese couples who are not used to participate in such programs. If involved in these programs in general, Chinese couples are expected to acquire general skills and therefore apply skills to enhance their relationship satisfaction, whereas they should also be taught to apply these skills based on daily situations (e.g., avoiding over complaining or expressing themselves). Therefore, clinicians and educators need to assist Chinese couples in identifying a jointly satisfactory level of applying these skills. More lines of clinical research are needed to help Chinese couples apply these skills to their daily life.

Finally, as Study 4 and Study 5 are the first empirical studies examining stress and dyadic coping mechanisms based the extended STM, findings at the within-person level might have valuable references for Western counselors, therapists and clinicians in providing service and implementing relationship education programs. It is well-recognized that Western couples are more individualistic than Chinese couples in pursing their personal needs and therefore their true needs of communicating stress and obtaining coping resources across daily situations should be highlighted, because some studies show that providing support or receiving support without request can decrease recipients' self-esteem rather than increasing their relationship satisfaction (e.g., Gleason, Iida, Shrout, & Bolger, 2008). Thus, Western practitioners should identify within-person mechanisms underlying Western couples' stress and dyadic coping processes and adapt programs aimed to not only improve their skills in

general but also fit to their needs of daily situations. Only in this way practical and clinical service can be more effective in assisting Western couples in dealing with stressors and catering to their demands of improving mutual relationship satisfaction.

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APPENDIX

List of Tables

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CURRICULUM VITA

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Education Background

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PhD student at the Department of Psychology, Clinical Psychology – Children/Adolescents & Couples/Families, University of Zurich. Supervisor: Prof. Dr. Guy Bodenmann

2006 – 2009

Master Studies of Sports Psychology, Beijing Normal University, China.

2001 - 2005

Bachelor Studies of English, East China Institute of Technology, China.

Professional Experiences

2016.3- 2016.5 Penn State University working with Prof. David Almeida

2015.9 - 2015.10 University of Queensland working with Prof. Kim Halford

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Publications

Published

Xu, F., Hilpert, P., Randall, A. K., Qiuping, L. & Bodenmann, G. (2016). Validation of the Dyadic Coping Inventory in Chinese Couples: Factorial structure, measurement invariance, construct validity, *Psychological Assessment*,

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Xu, F., Hilpert, P., Almeida, D., & Bodenmann, G. Conflict reactivity in Chinese couples.

Xu, F., Hilpert, P., & Bodenmann, G. The Joint influences of Neuroticism and situation on coping behaviors in couples.